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NetworkWorld

Y2K FIXES
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January 10, 2000 Volume 17, Number 2

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STARTING from SCRATCH

BY JEFF CARUSO

A recipe for building a brand-new corporate network.



Banyan's David Orifice says his company is "wiring for growth."

Some days, you probably get a bit fed up with your network and just feel like scrapping it and starting over.

Well, what if you could? What would your brand-new campus network look like?

Some companies actually get that opportunity, be they start-ups building new infrastructures or established companies wiring new buildings. Often these networks follow a distinct pattern. With no legacy equipment to consider, executives opt for both hot technologies such as Layer 3 switching and evergreens such as IP and Ethernet. Today's recipe for a new network installation looks something like this:

See **From scratch**, page 61

Voice over IP gathers steam

Carriers prepping integrated voice/data services.

BY DENISE PAPPALARDO AND TIM GREENE

ham, Mass., expects service providers around the world to spend nearly \$1 billion See **VoIP**, page 16

Fueled by a group of traditional telecommunications service providers, voice-over-IP services are expected to become more prevalent within the next 18 months.

AT&T, MCI WorldCom, Bell Atlantic, SBC Communications and BellSouth are busy setting up packetized voice trials and planning new integrated voice and data services for business and residential users.

To prepare for this change, International Data Corp. (IDC), a market research firm in Framing-

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OVER THE IP AIRWAVES

White paper: Sending voice over IP.

Feature: Voice-over-IP reality check.

DocFinder
find it **6336** online

Win 2000 VPN technology causes stir

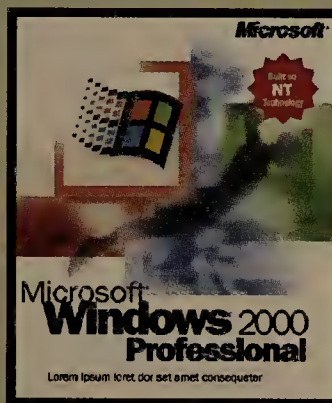
BY ELLEN MESSMER

REDMOND, WASH. — When it ships next month, Microsoft's Windows 2000 will come with technology for setting up an IP Security-based virtual private network (VPN). The question is: Will established VPN products from other vendors work with Microsoft's technology?

It appears that the answer will be a grudging "yes." Many VPN vendors have ardently

opposed Microsoft's implementation, complaining it adds data overhead and slows down transaction processing. But these same companies, such as Check Point Software and Newbridge Networks, acknowledge that they can't afford to ignore that hundreds of thousands of desktops will probably end up running Microsoft's new software.

Microsoft's IPsec "flavor," jointly developed with Cisco, See **IPSec**, page 14



REVIEW: Win 2000

Our hands-on testing shows Microsoft's NOS is more stable, better performing and easier to manage. Page 20.

Papows out at Lotus; IBM vet to take control

BY JOHN FONTANA AND MARC SONGINI

The sudden resignation of Lotus CEO Jeff Papows last week is setting some enterprise customers on edge, while others say the move will bring a renewed focus to the company.

Papows' resignation, effective Feb. 1, comes within a year of a host of scathing press

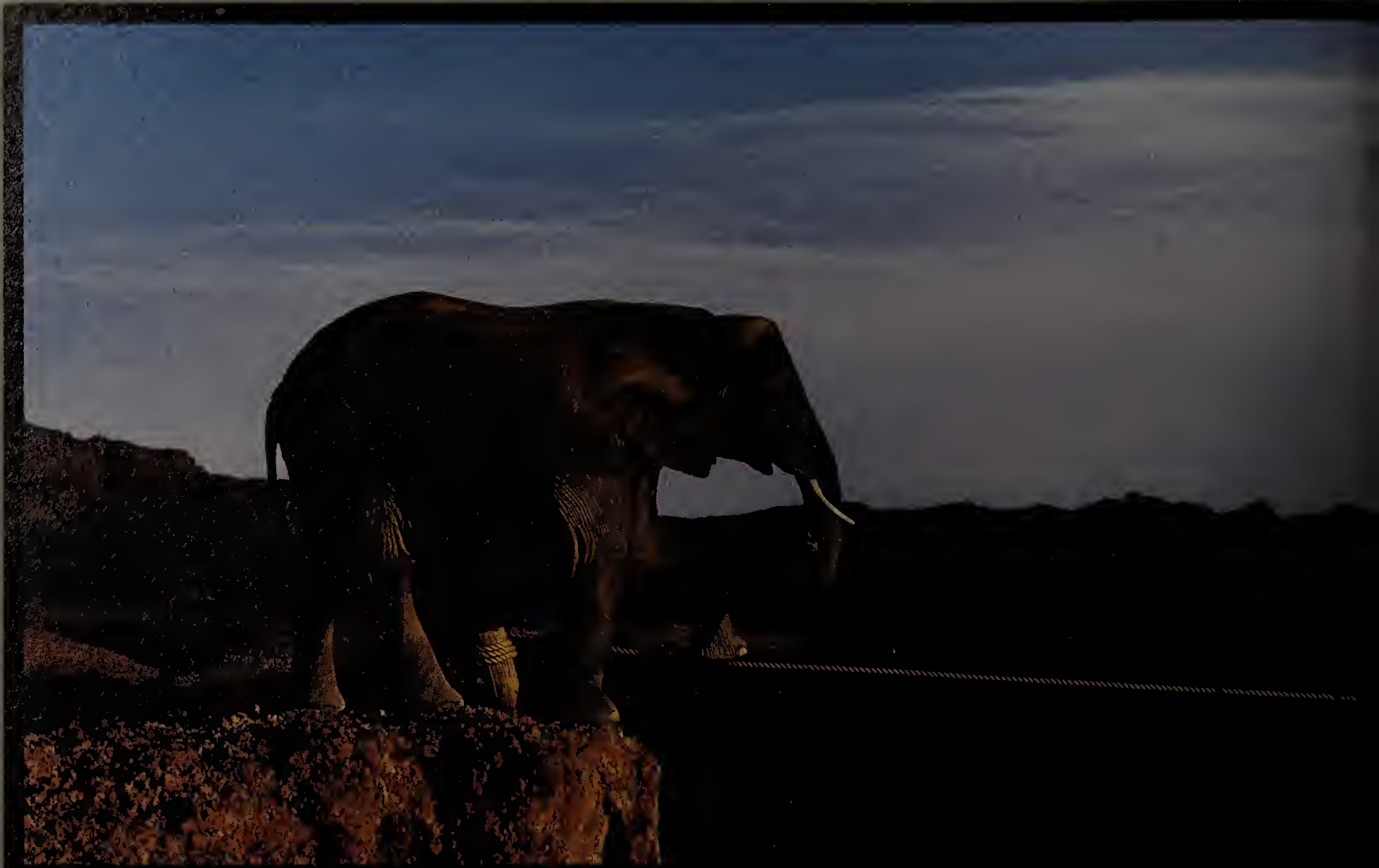
reports about his character and the filing of a sexual discrimination lawsuit by a former employee. Papows, 45, will be replaced by 23-year IBM veteran Al Zollar, who was general manager of the company's now-defunct Network Computing Software Division.

Reaction from customers and business partners ranged See **Papows**, page 12



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THIS WEEK
ONLINE



Water Cooler. So what do Novell, Oracle, Amdahl and every other vendor have in common?

They've all developed a strategy to become your application service provider (ASP). But if everyone is an ASP, then how do the vendors differentiate themselves? More importantly, how are network executives expected to tell the players without a scorecard? Features Editor Neal Weinberg lets you know in this week's Water Cooler. **DocFinder: 6344.**

Post Y2K. Lots of companies are staring at their empty IS wallets, but who's to blame? IS departments would argue the upgrades were a long time coming. But to the tune of \$100 billion? Find out where the money went in our Y2K package. **DocFinder: 6340.**

Windows 2000. What's the critical downfall with Microsoft's new operating system? The fact that you need an all-Windows environment to get the most bang for your buck. "Enterprise installations won't reap full benefits from server upgrades unless they also put Windows 2000 on all their desktop machines because the most useful features of Windows 2000 server editions are confined to networks that are homogeneously Windows 2000," says reviewer Tom Henderson. **DocFinder: 6345.**

Powerometer. How does AT&T compare to MCI WorldCom in terms of power? AT&T ranks fourth on our list of most powerful companies, while MCI WorldCom ranks 10th. Plug in your favorite companies to find out how they stack up against each other in our annual Power Issue. **DocFinder: 6135.**

The RFP Zone. Need to get answers to your network requests for proposals (RFP)? From site development to ISP services to multimedia installments, we've got you covered. Just head online to our ITrfp area and plug in your needs. We've got the top vendors standing by to give you quick responses. **DocFinder: 6346.**

NetworkWorld

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Special Focus

IP MULTICAST GROUNDED

IP Multicast still waiting for takeoff.
Page 24.

FEATURES



DIARY OF A HACK ATTACK

Ever wonder how a hacker would go about attacking your network? We tag along as "Bob the hacker" sets his sights on an e-business.
Page 42.

FEATURE: The top 10 TCP/IP troubleshooting tools. **Page 44.**

REVIEW:

HP's ProCurve 9304M Gigabit Ethernet switch is a packet-pushing powerhouse. **Page 45.**



NEWS BRIEFS, JANUARY 10, 2000

Leader's death saddens user group



A sad note was struck during the holiday season for one of the nation's key telecom user groups: Ellen Van Cleve, first vice president of the Communications Managers Association (CMA), died

suddenly Dec. 19 of a pulmonary aneurysm. She was 62.

Van Cleve, who was director of data communications for *The New York Times*, was to have become CMA's president this month.

Coleman, at the CMA, which principally serves WAN managers in large organizations based in the Northeast, remembers Van Cleve as a tireless advocate for service improvement from key carriers in the region. She was "extremely influential" in grabbing the attention of major-carrier executives to hear the concerns of corporate network professionals, says Andrew Stratford, CMA's 1999 president. Yet Van Cleve also argued against excessive regulation, and often said regulators should allow Bell Atlantic into long-distance to give users a new networking option. That view — expressed very recently in these pages — turned into an unfortunate irony: She passed away three days before the Federal Communications Commission approved Bell Atlantic's long-distance application for New York. The CMA is considering establishing a scholarship in Van Cleve's name for female network professionals.

Wal-Mart spins off a dot-com

Wal-Mart won't be just your neighborhood retailing behemoth anymore. The heaviest of the brick-and-mortar heavyweights last week announced that it will create a Palo Alto independent company — Wal-Mart.com — in order to speed development of its online retail site. Venture capital firm Accel Partners will join with Wal-Mart in the undertaking. The Wal-Mart.com board will include Wal-Mart Chairman Rob Walton; Lee Scott, vice-chairman and chief operating officer of Wal-Mart; and James Breyer, managing partner of Accel.

Short-time CEO out at Baan

Baan CEO Mary Coleman resigned last week after less than a year at the helm of the troubled maker of enterprise resource planning software. In a concurrent announcement, Baan reported it would close 14 branch offices and reduce its worldwide work force by about 4% in an attempt to reverse the company's recent misfortunes. Baan has incurred losses over the past five quarters, amid restructuring and a drop in revenue for its core ERP business. The current chairman of the Baan supervisory board, Pierre Everaert, will serve as interim CEO while the search for a permanent CEO of the business software maker is under way, Baan said in its statement. Baan has headquarters in both the Netherlands and Reston, Va.

Nortel buys DSL switch vendor

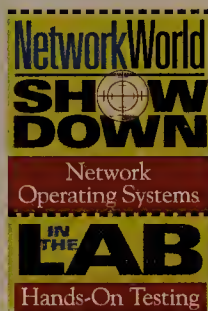
Nortel Networks plans to buy digital subscriber line (DSL) switch specialist Promatry Communications for \$778 million in stock. By snapping up Promatry, Nortel gains access to Promatry's ATM-based Intelligent Multi-service Access Switch (IMAS) edge switch. This device takes in traffic in a number of DSL flavors and sorts customer traffic to ensure various levels of service quality. Quality of service is a must for transmitting voice-over-DSL lines to avoid gaps and delays in voice transmissions. In addition, carriers can use the IMAS to offer different levels of service quality at different prices. So a customer who uses a DSL line for e-mail and Web surfing could buy a less-expensive, lower-quality connection than someone using a DSL link to tie into a corporate network for business reasons. In combination with Nortel's cable modem and wireless access gear, the Promatry deal will round out the company's broadband access offerings for residences and small businesses.

Security start-up includes 'Mudge'

A Cambridge, Mass.-based security start-up that debuted last week will feature the leader of a renowned hacker group as vice president of research and development. Backed by \$10 million in capital from Battery Ventures, @Stake, Inc. will lean on the expertise of a hacker organization called the L0pht and its well-known front man, who goes by the moniker Mudge. The new company's chief technology officer will be Daniel Geer, former vice president and senior strategist at CertCo and director of engineering at Open Market. @Stake promises to provide "non-traditional, e-commerce-age security solutions."

Shopping for a NOS?

Network World is offering a hands-on comparative look at Microsoft Windows 2000, Novell NetWare 5.1, Red Hat Linux 6.1 and The Santa Cruz Operation's UnixWare 7.1.1 to all ComNet 2000 trade show attendees in Network Operating Systems Showdown Lab. The lab will be located in the main lobby of Washington, D.C.'s Renaissance Hotel and be open Jan. 25 to 27. Attendees will get a customized view of how these NOSes stack up against each other. Attendees also will be able to pick the brains of the engineers from Centennial Networking Labs at North Carolina State University, the Network World Test Alliance partner that conducted this first public showdown between Windows 2000 and its competition in the NOS arena.



Cisco recalling Catalyst 5000 cards

BY JIM DUFFY

SAN JOSE — Cisco is recalling some 10Base-T Ethernet switching modules for its Catalyst 5000 LAN switches because the boards can short out and disable networks.

The company is recalling about 11,000 — or 15% — of the 75,000 48-port 10Base-T Ethernet boards currently installed in enterprise networks. These modules fall within a serial number range that Cisco has identified as potentially defective (see graphic).

Fourteen of these boards have already shorted out, a Cisco spokesman says.

The shorting has been isolated to a copper defect in the module's printed circuit board. The short can cause the module to fail and likely disrupt the operation of the switch in which it is installed, according to a Cisco field notice on Cisco's Web site (www.cisco.com/warp/public/770/fn9151_12081999.shtml).

The short will cause the switch's power supplies to go into overcurrent shutdown, thereby cutting off power to the switch, the field notice states. The short creates smoke, but no fire or sparks. The failure may also cause damage to the switch backplane, rendering the switch inoperable.

Cisco is urging customers to replace affected boards with 48-port 10Base-T switching modules that do not fall within the serial number range associated with the recalled modules. Should a short occur, Cisco is urging customers to replace the entire switch in which the affected module resides. Cisco is offering free replacement hardware and software, the spokesman says.

Cisco customer PeopleSoft is using the potentially defective modules but so far has not been affected by the short. The company plans to replace the modules with other 48-port 10Base-T boards as part of an overall network upgrade program, says Stan Christensen, senior network engineer at the Pleasanton, Calif., software

Cisco module recall

Cisco will replace for free its defective 10Base-T Ethernet switching modules for the Catalyst 5000. The company has identified modules with the following serial numbers as faulty:

- 9194340 — 9194344
- 9209350 — 9209999
- 9210000 — 9214338
- 9301601 — 9302230
- 9880340 — 9883950
- 10120340 — 10125399
- 10172043 — 10175339
- 10290340 — 10295339
- 10510340 — 10515339



Catalyst 5000

company. "We're upgrading some of our older cards so we decided to go ahead and evaluate how many [defective modules] are out there and just go ahead and swap them out," Christensen says. "We've not been impacted at all, and we actually have a pretty decent number of those cards."

Reports surfaced last week that Cisco fired the contract manufacturer of the 10Base-T modules. But a company spokesman denies that.

"We didn't fire them; we took them off the certified list and are working with them to get them recertified," the spokesman says. He declined to name the manufacturer, which was recertified late last week.

The spokesman says the recall will not materially affect Cisco's earnings for the second quarter of fiscal 2000. He declined to state how much the episode will cost the company.

"It's insignificant enough that it's not going to be a reported item," he says. ■

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VeriSign takes the pain out of digital certificates

Go Secure service automates digital certificate enrollment and registration to verify Check Point VPN users.

BY TIM GREENE

MOUNTAIN VIEW, CALIF. — VeriSign thinks it should be easier to use digital certificates to verify virtual private network (VPN) users, so the company is simplifying the process.

Rather than using a cumbersome manual procedure to enroll in VeriSign's certificate authority service, users of the company's new automated service will be able to simply integrate VeriSign certificates and encryption keys with VPN gear made by other vendors.

The first vendor to partner in the VeriSign venture, known as Go Secure, is Check Point. VeriSign plans to announce similar relationships with Nortel Networks and other VPN vendors later this year.

To use Go Secure, customers must first buy a Check Point VPN-1 firewall or SecureRemote VPN software. Neither of those products comes with digital certificates.

In the past, customers could

buy a VeriSign service called On-Site to get digital certificates, but they had to configure their VPN clients manually.

This task is so complicated that it requires an IS staff member to register each end-user machine, says James Mascaro, network architect for Xcelerate, an e-business consultancy in Fort Lauderdale, Fla.

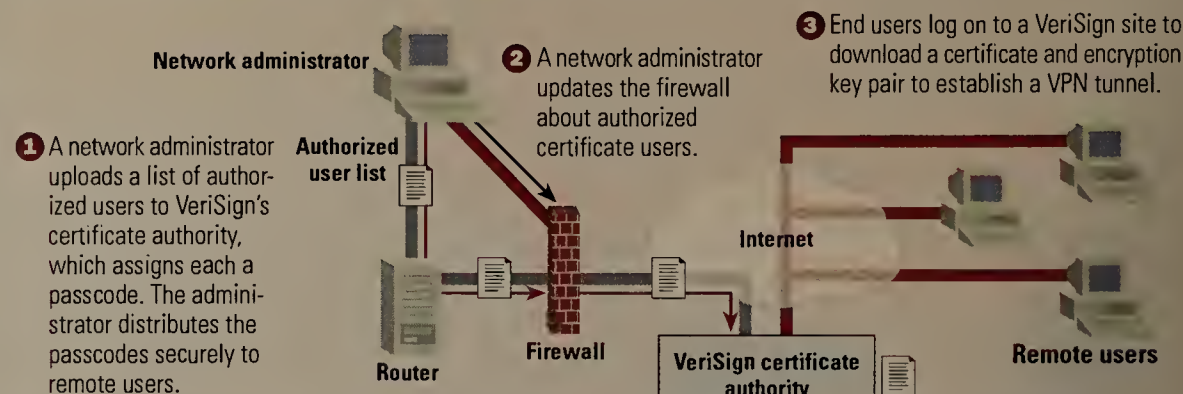
"It's a rather lengthy and easily messed-up process," Mascaro says.

"As soon as you get a large number of users, distributing certificates becomes unmanageable," says Steve Harris, an analyst with International Data Corp. in New York.

With the Go Secure service for Check Point products, rather than going through a complex string of downloading files and importing them into Check Point VPN software, end users log on to a Web site and click twice. They can then use a VeriSign certificate to authenticate themselves for the purpose of exchanging encryption keys used to secure

Getting certified

Users of Check Point VPN gear can now buy public-key infrastructure services featuring streamlined digital certificate distribution, compliments of VeriSign.



Internet connections.

For Check Point, Go Secure automates interactions between an end user's Web browser and a Check Point client to install certificates. With Go Secure for other vendors, automation of the VeriSign enrollment will take place within the VPN client software itself.

Without the automated process, Check Point end users would have to pick up

certificates from a VeriSign Web site and install them in their browsers. Then users would export them to their hard drives and import them into their Check Point clients.

"It's ugly," says Marshall Behling, VeriSign's strategic business development manager.

With Go Secure, network administrators have some work to do before end users can use the automated enrollment. First they must upload a list of

authorized users, and each one is assigned a passcode by VeriSign. The lists can be integrated with existing firewall user databases or Lightweight Directory Access Protocol files.

Administrators then distribute the passcodes securely and tell end users to pick up their certificates at a secure VeriSign Web page.

Go Secure for Check Point costs \$35,000 for up to 500 users or \$60,000 for 1,000 users. It will be available in February.

Go Secure for Nortel Contivity products is scheduled for release this spring, but no other details were available. Go Secure for other vendors' products is scheduled for later this year.

VeriSign: www.verisign.com

J.D. Edwards offering ERP suite as hosted apps

BY ELLEN MESSMER

DENVER — J.D. Edwards & Company last week began offering its enterprise resource planning suite as a hosted online application through UUNET, MCI World-

Com's Internet division.

Todd Huebsch, J.D. Edwards' director of business development, says the ERP firm is teaming with Deloitte Touche to help business customers set up J.D. Edwards' OneWorld applications for

access over public or private networks.

The six OneWorld applications include financial reporting, manufacturing and project management. Pricing on the hosted version is determined on a case-by-case basis, and Huebsch declined to detail the savings a company might expect from choosing that route instead of buying.

Two years ago, J.D. Edwards worked out agreements with a handful of business partners, including IBM Global Services and Aristisoft, to let them provide the OneWorld suite as application service providers (ASP). Now J.D. Edwards is getting into the hosted application business because of predictions that the market will grow dramatically.

One company adopting the ASP way of life is Spyder Active Sports, a Boulder,

Colo., maker of ski and sports apparel. Spyder calculates that it saves between \$30,000 and \$60,000 per year by outsourcing to Prentice, an ASP in Denver and a J.D. Edwards partner.

Kevin Smith, Spyder's IS manager, says the firm was careful in crafting a common understanding with Prentice about guaranteed uptime and that the company retains full control of its OneWorld data housed in Prentice's facility.

"In our contract, there's wording that says under no circumstances can they hold our data during any dispute," Smith notes. He adds that Spyder's employees are going to access the hosted financial application through a private T-1 line and the public Internet.

J.D. Edwards: www.jdedwards.com

OneWorld, many functions

Descriptions of suites and their applications in J.D. Edwards OneWorld:

Application suite	Features and applications
Foundation Suite	Address book, financial analysis spreadsheet and computer-assisted design.
Financial Suite	Accounts receivable/payable and general ledger.
Distribution Suite	Equipment, inventory and transportation management, facility planning.
Manufacturing Suite	Product data and configuration management.
Project Management Suite	Property management, order processing, inventory management and contract billing.
Human Resources Management Suite	Human resources time accounting.
Payroll Suite	Payroll time accounting.

Be a Net Know-It-All

For the answer to this week's question and more net trivia, visit **Network World Fusion** and enter 2349 in the DocFinder box.

This week's question:

What Linux vendor was originally known as Gesellschaft für Software und Systementwicklung mbH?

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Y2K efforts have long-term benefits

Network upgrades, accurate inventories and streamlined procedures result from Y2K preparation.

BY CAROLYN
DUFFY MARSAN
AND JOHN COX

Were Y2K remediation efforts a big waste of time and money for corporate America? The answer looks to be a resounding no.

Network professionals report a host of benefits they will enjoy in 2000 and beyond because of IT inventories, business analysis and system testing completed under the umbrella of Y2K preparedness.

Overall, the U.S. spent more than \$100 billion fixing the Y2K problem since 1995, according to John Koskinen, the federal government's Y2K czar. He estimates that the rest of the world spent an additional \$100 billion to repair and replace computer systems and networks in preparation for the millennium date change.

The investments appear to have been wise. While many government agencies and companies experienced minor Y2K-related glitches, no significant system outages occurred over New Year's weekend. And although it's too early to declare victory over Y2K, date-change problems expected during the next few weeks and months will likely be nuisances rather than business-crippling matters.

Lesson learned

As IT executives close up their command centers, they're putting together the lessons they've learned from the Y2K drill. They say one of the biggest advantages is Y2K forced them to thoroughly inventory and document IT systems and networks.

"We were able to conduct a very intensive inventory of all our systems," says Lyn McDermid, chief information officer of Virginia Power in Richmond, Va. "As a result of that, we've eliminated quite a few redundant applications, and we eliminated systems that were obsolete. That

of our current computing environment and our software development," Dec says. "So they can accurately plan how to move forward with changes."

These inventories are especially valuable for corporate networks, which tend to grow like kudzu.

"Corporate networks were all looked at very carefully and cleaned up," says Tom Oleson, research director and IT advisor at International Data Corp., a market research firm in Framingham, Mass. "This will make it easier for companies to move onto the Internet and create e-commerce-type activities."

Planning ahead

Another positive outcome of Y2K is that companies have analyzed and prioritized their business systems and created disaster-recovery plans.

"Y2K opened up a lot of eyes as to how large our network is and that it provides a lot of functionality," says Mike Green, a senior messaging analyst with Thomson Financial in Boston. "We had to consider what we would do if everything fell on its face. It forced us to consider our policies, procedures and documentation."

Thomson considered disaster recovery when it recently migrated to a Microsoft Exchange system with distributed management capabilities. "We structured it in such a way that any one of our major sites can run the whole show," Green explains. "If we get a snowstorm like the Blizzard of '78, folks in the U.K. or Australia could get into my environment and manage it."

Another benefit of the Y2K experience is that many organizations tightened up their procedures for testing applications, systems and interoperability. This should allow IT departments to deliver higher-quality software, on time and at lower cost.

"We've put in place better testing processes and more independent testing and verification because of Y2K," says

Bill Robertson, Year 2000 program manager at the American Red Cross.

Virginia Power will now get a broader view of its systems thanks to the Y2K effort, according to McDermid.

"We'll be a lot more tuned in to looking at the overall impact of how systems integrate with each other," McDermid says. "We always looked at systems from a transaction perspective. But because our environment is so highly complex, there's very little in one application that doesn't have an effect somewhere else."

In coordinating Y2K remediation efforts, IT staffs gained valuable experience with project management tools that will be put to use in the future.

Prudential, for example, created a special council to document best practices and set standards for project management across the company. Virginia Power will use the same project management organization from its Y2K effort to coordinate a merger with Consolidated Natural Gas of Pittsburgh that is expected to close Jan. 28.

The Y2K coordination efforts have led to better working relationships for IT departments, within their organizations and with suppliers and partners.

"One of the benefits of the Y2K experience is that it helped build a sense of team," says Robertson. "We had the whole organization working on this issue, not just the IT shop." ■

Y2K spending: Worth the price

Many network professionals are saying that money spent in preparation for Y2K not only made their systems compliant, but also more efficient overall.

U.S. spending on Y2K
(in billions)



Total worldwide Y2K spending



Note: Figures are estimates

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

should reduce our support costs.

"We were also able to introduce some new technology and jump-start our Web development," McDermid adds. "We feel that we really did get ancillary benefits from Y2K."

Similarly, Prudential Insurance created strategic inventories of its software, hardware and business partners. Irene Dec, Prudential's Y2K program manager, says these inventories will allow the financial services giant, headquartered in Newark, N.J., to move faster in adopting computing standards, which will in turn simplify software development, management and maintenance.

"Our senior IS management now can get a complete view

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Lotus hopes to soar with Raven

BY JOHN FONTANA

CAMBRIDGE, MASS. — Since Lotus has already let plans for its Raven knowledge management suite out of the bag, the company will use its annual user conference next week to answer questions as to whether the project will fly in the enterprise.

Raven is the code name for a collection of technologies Lotus hopes will make it easier for users to build desktop portals, and organize and access data. Raven is expected to be a major topic during Lotusphere 2000 in Orlando. Lotus also is expected to detail support for XML throughout Domino and tout offline services that open Domino replication to Web browsers and other clients. The company also will hype Domino R5, which enterprise customers have been slow to adopt.

But Raven is key as Lotus pushes collaboration beyond shared calendaring and threaded discussions. Raven com-

bines a data store based on IBM's DB2 with sophisticated indexing, searching, instant messaging capabilities and a desktop interface with such services as e-mail, discussion groups and data repositories. Raven is designed to help users locate data, find users who have expertise with that data and contact those users instantly. Microsoft is countering with its Digital Dashboard, a customizable desktop portal, and a set of search and index tools code-named Tahoe.

The intent of both vendors is to allow enterprise users to mine data from the mountain of electronic documents stored in database, e-mail and file systems.

Lotus provided a glimpse of Raven late last year at Lotusphere Europe, but many users and analysts say they saw nothing more than a concept.

"Raven is easy to visualize, but I'm wondering what pieces of it will actually work for us," says Mike DiNapoli, knowledge management system administrator

for Keane, Inc., an IT services firm in Boston. The company uses Domino as the foundation of an internal knowledge management application called KMS and is hoping Raven will eventually replace Domino's weak search engine. "My feel is that Raven is a component strategy, and we'll evaluate those com-

Papows,
continued from page 1

from gloom about the future of Lotus to relief that Papows' present troubles are now behind the software maker.

"I am not optimistic. IBM is sending a suit to the top of Lotus, and that will be the end of that," says Scott Wenzel, who maintains a number of unofficial Lotus-related Web sites and is a Notes administrator for a large federal agency. "The Lotus culture has been grinding against IBM, and Papows was the friction point."

Papows alluded to this in his internal memo to staff announcing his resignation, saying: "I would like to once again lead an independent organization."

Bad press a factor?

IBM and Lotus officials publicly insisted that Papows' resignation was unrelated to the negative press reports and harassment allegations. The resignation comes just a week before the Lotusphere 2000 customer conference, which Papows will attend.

"The powerhouse of Lotus is at Iris [a software development subsidiary], and IBM has been driving the overall company for years now," says Paul Meredith, a network administrator at Steelox Systems in Mason, Ohio. "I'm not sure the resignation makes that much of a difference."

But one former employee says Papows' resignation means Lotus "has lost its identity, and IBM is pulling together [the different components of] its software division." Lotus' identity was that of an innovative software company marked by intelligent, quirky employees. But the ex-employee, who asked not to be identified, concedes that the resignation will give Lotus a better opportunity to focus and will make it a more tenacious competitor.

ponents and see what we can use," DiNapoli says.

While Lotus says Raven is a cornerstone of its knowledge management platform, observers say the company has a lot of work to do. "Lotus needs to provide examples as to what Raven can do," says Jon Johnston, a senior technology analyst for Creative Business Solutions, a systems integrator in Minneapolis.

Raven is expected to go into beta testing this quarter and ship around midyear. ■

"There has been a level of frustration in the developer community because Papows has been a lame duck," says David Shimberg, executive vice president of IT Factory, one of Lotus' top business partners. "The organization was at a standstill, and this takes away a distraction."

Lotus was nowhere near a standstill for most of Papows' term at the helm. In 1996, he took over a company that was suffering. IBM was facing harsh criticism for acquiring Lotus, which critics said would be made obsolete by the Web. But Papows helped turn Lotus around, driving the installed base of Notes/Domino to a purported 50 million seats and returning profitability to the company.

But last April, a scathing article in *The Wall Street Journal* rocked Lotus and Papows. The story contended that Papows had lied about and exaggerated his

personal history, military experience and educational records. And less than a month later, Papows was named in a sexual discrimination complaint brought by a former Lotus employee.

Not a stuffed shirt

Taking Papows' place will be the soft-spoken and introspective Zollar, who has held a number of management positions at IBM, including vice president of development for Tivoli.

"He has a very good reputation," says Nick Francis, CEO of Tavve Software and a former IBM executive who worked with Zollar in Research Triangle Park, N.C. Francis notes that Zollar is not a stuffed blue shirt from IBM's old days. "He's always been out of the box and gone away from the traditional approach. He will fit in well at Lotus." ■

The ins and outs at Lotus

Jeff Papows resigned as Lotus' CEO last week after a year under the gun. He will be replaced by Al Zollar, former general manager of IBM's now-defunct Network Computing Software Division.



New CEO Al Zollar



Former Lotus CEO Jeff Papows

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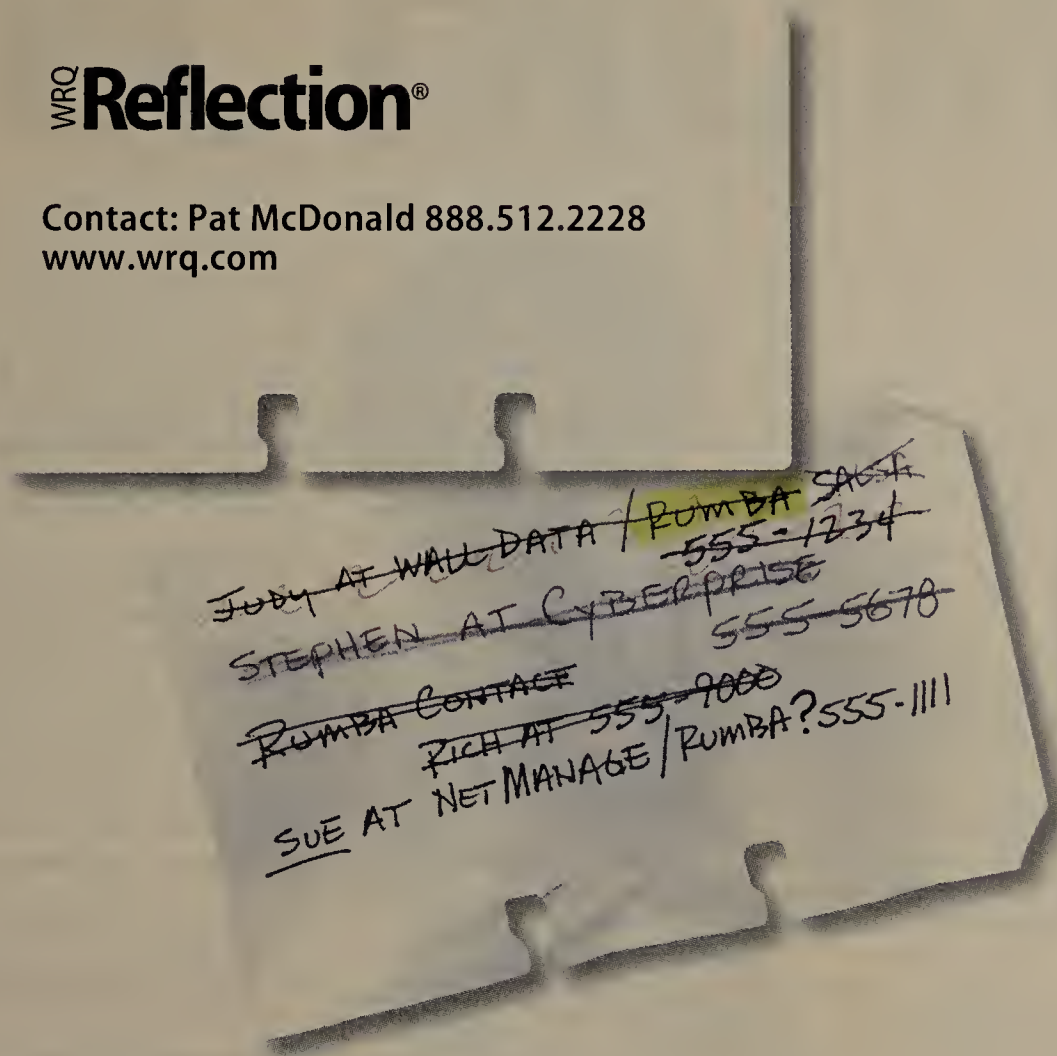
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Microsoft and Intel shrink the size of computers

BY JOHN COX

LAS VEGAS — Once you got past the voice-activated light switches and the multimedia advances in Internet pornography, last week's 2000 Consumer Electronics Show (CES) actually had news that corporate IS managers should note.

For instance, Intel jumped

into the Web appliance market by revealing plans to offer an array of hardware and software products. These products, along with a range of development services, are designed to help telcos and ISPs create new Web services that will be accessed by a range of Web appliances, including handhelds.

Officials said Intel is creat-

ing its own line of Linux-based Web appliances, which carriers will be able to buy in bulk and resell or give away to users who subscribe to the carriers' services. The first products will be available around midyear.

Along with other partners, Intel will help the service providers develop new applications, and information, for

these appliances. Finally, Intel is building management software that will let the carriers remotely support and manage the new services.

Despite the seeming consumer focus of the announcement, the carriers are likely to see the biggest — and most profitable — demand for such wireless services from businesses.

formerly called Rapier, simpler to use and easier to write for.

The new devices, to be built by Compaq, Casio, Hewlett-Packard and other vendors, will include Microsoft Reader, a program that greatly sharpens the appearance of text on an LCD screen.

Microsoft also said it will offer its MSN Mobile Service through carriers and service providers. These third parties can now package MSN Mobile, which gives subscribers wireless access to the Microsoft Network (MSN).

In addition, Microsoft unveiled MSN Mobile Service 2.0, which now will run on Web-enabled cellular phones. MSN Mobile 2.0 will be integrated with MSN Hotmail, Microsoft's Web-based e-mail service, and with other Microsoft offerings, such as MSN Money Central and Expedia.com.

*Additional reporting by
IDG News Service*

IPSec,
continued from page 1

combines Layer 2 Tunneling Protocol (L2TP) with IPSec encryption in order to support non-IP protocols and authentication mechanisms attractive to companies conducting business-to-business e-commerce. Until fairly recently, it was unclear whether Microsoft would actually be able to squeeze the VPN features into Win 2000.

Now that Microsoft is readying Win 2000 for a Feb. 17 general release, VPN vendors are scrambling to add support for

L2TP/IPSec to their offerings.

Newbridge, for instance, will upgrade its TimeStep Permit VPN gateway to support L2TP this year so that it can work with Microsoft clients as well as TimeStep IPSec clients, says Tim Hember, a vice president at Newbridge.

"But L2TP will be a burden on the customer — it doesn't scale up very well," Hember grumbles.

Another VPN competitor, RadGuard, has also been forced to recalculate its strategy in the face of the Microsoft VPN invasion.

"If you're using IP, we don't see the reason to use L2TP," says Iris Tal, RadGuard's technical support manager. "It only causes overhead for network traffic because it's 'double-tunneling.' But because of Microsoft's L2TP client software, I'm sure we'll do the support for it in our product."

"If Microsoft weren't deliv-

ering this in their operating system, there would be a lot less gnashing of teeth," notes Mark Elliott, a product line manager at Check Point, which counts 15 million of its own VPN clients on desktops. "But we have to support the Microsoft client because we presume it will be the general enterprise desktop client later in 2000."

Ashley Laurent, a company in Austin, Texas that builds IPSec software code for large vendors, including IBM and foreign military organizations, is working on L2TP-based IPSec code under contract for unnamed customers.

The company is doing so somewhat reluctantly. "We won't recommend L2TP to our customers," says Jeff Goodwin, Ashley Laurent's CEO. The company's analysis of Windows 2000's VPN technology shows that it is unstable and adds 10% more overhead to data content during transmissions.

Still, Goodwin notes that the IPSec efforts of the IETF and industry groups such as the International Computer Security Association have not yet successfully resolved the technical issues pertaining to building a strong, interoperable IPSec client. He hopes the recent IETF draft "DHCP Configuration of IPSec in Tunnel Mode" and the "XAUTH" authentication proposal eventually will replace Microsoft's L2TP.

But with VPN vendors embroiled in interoperability battles for years and the problem of the IPSec client unresolved, Microsoft's entry

with its Win 2000 VPN will be a tempting prospect for the user community.

Microsoft customers will need L2TP with IPSec to make use of various password-based authentication protocols, such as Pap, Chap, MSChap and the Extensible Authentication Protocol, says Rob Cully, Microsoft's lead product manager for Windows networking. He points out that Win 2000 also includes a Radius server for handing off these types of authentication requests.

Microsoft's VPN technology can also be used to encrypt multicast conference sessions, such as those using NetMeeting.

Not all vendors have been opposed to L2TP, Cully says, pointing out that 3Com, Lucent, Nortel Networks, Altiga Networks and Network Alchemy are in the process of deploying or testing L2TP/ IPSec in their products.

However, Cully says there's some truth in the criticism that Microsoft's IPSec raises overhead. And for that reason, Microsoft has included technology in Win 2000 to help companies build encryption accelerators that speed up transaction processing on machines running Microsoft's new software.

In the next few weeks, nCipher will announce a version of its nFast accelerator for Win 2000, company sources say. Separately, 3Com is shipping a card dubbed Typhoon, and Intel is working on a coprocessor that supports Win 2000 and that will ship later this year. ■



Newbridge's Hember says, "L2TP will be a burden on the customer."

Microsoft flexes

Not to be outdone by its sometimes partner, Microsoft made a splash at CES, with a keynote address by CEO Bill Gates and new announcements in the appliance market, including some further tinkering with the Windows CE operating system, and an expansion of wireless Web access services.

During his speech, Gates demonstrated a new class of device, based on yet another version of Windows CE, called the Pocket PC. Microsoft seems to have stripped yet more from Windows CE to make the Pocket PC platform,

More breaking news

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Excite offers free 'Net access

Want a free Internet service, but don't trust some of the smaller, newer players offering these ad-based services? Well maybe ExciteAtHome will change your mind. The well-known company last week teamed with 1stup.com to provide free Internet access.

A lot of folks claim that such services are only for consumers — that business types would laugh companies like Excite out of the room. But didn't critics say the same thing about sub-\$1,000 PCs and PalmPilots?

DocFinder: 6341

Sun says fixes in place to stop attacks on Solaris servers

Sun has had a lot of fun making jokes about Microsoft security problems. Well lately, some Sun servers have been overwhelmed by clever denial-of-service attacks. Sun says it learned of the problems months ago, and patches were written and posted long ago. **DocFinder: 6342**

Microsoft's Taiwan Web site hacked

Guess who forgot to use its own patch? Microsoft. How do we know? Because hackers had their way with Microsoft's Web site in Taiwan. By failing to patch its Web Server, Microsoft left itself open not just to the hackers, but also to the embarrassment of ignoring its own advice. **DocFinder: 6343**

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VoIP,
continued from page 1

installing voice-over-IP gateways by the end of 2001 (see graphic).

Because these new, unified carrier networks will simply be switching packets, integrating voice and data traffic will be easier than it is with separate voice and data networks.

That will result in services such as unified messaging, in which voice, fax and e-mail are all combined.

These new networks will also be less expensive to install and easier for carriers to manage than traditional voice networks.

So when the likes of AT&T and BellSouth start rolling out voice-over-IP service bundles, business users should expect cost savings, says Lisa Pierce, director of telecommunica-

user who has deployed a private voice-over-IP network questions whether carriers will be able to quickly become experts in voice-over-IP technology.

"I'm not sure carriers can do a much better job supporting IP telephony than I can," says Rod White, vice president of telecommunications for Home Shopping Network in St. Petersburg, Fla. "And I don't want them to become experts by trying things out on me."

Small deployment

It seems many other users feel that way, too. A recent study by Faulkner Information Services indicates that only 7% of enterprise customers have deployed any voice over IP, and those who have installed it in only small pilot projects in least-critical environments (NW,

necessary for voice quality.

MCI WorldCom is the exception. It is in the process of putting together an IP network that will support combined voice and data services, says Frank Nigro, director of converged services at MCI WorldCom.

MCI WorldCom is in the midst of an employee-only service trial that the company will soon expand to include enterprise business users.

Nigro says MCI WorldCom is in the process of building a 100% pure IP backbone that will take advantage of existing facilities, but will include new electronics and software.

"This is not a science project anymore," Nigro says. "We're constructing a carrier-grade IP network to support large business users' on-net and off-net voice and data traffic."

While MCI WorldCom is looking at supporting voice-over-IP services over a pure IP network, AT&T is looking at offering the technology over its Internet backbone.

AT&T expects to offer a voice service over its Internet backbone before year-end. With the service, customers will be able to send intra-company voice, fax and off-net voice traffic over AT&T's ATM Internet backbone, says Cliff Radziewicz, general manager of global IP telephony services at AT&T.

In September, AT&T started a service trial that provides multinational enterprise users with voice services over AT&T's Internet backbone. But the trial is limited in scope — it has only two customers on the network. One customer is making voice calls from the U.S. to the U.K., and the other customer is making calls from the U.S. to Asia over the Internet.

"The trial is going well, and we expect to increase the call volumes soon," Radziewicz says.

AT&T and MCI WorldCom are clearly gung-ho about voice over IP, but Sprint has a different take on the technology.

Sprint will not be rolling out any managed or integrated voice-over-IP services, but rather will point customers looking for an alternative to traditional circuit-switched

voice services to its Integrated On-Demand (ION) service.

ION lets business users send voice and data traffic over the same ATM-based connection. AT&T has a similar service called INC. Both services rely on ATM rather than IP for service delivery.

Such services are expected in nine to 12 months, according to Mick Stefanik, research director for advanced data networking technologies at BellSouth.

What's in store?

IDC expects that business users will start adopting inte-

■ **"I'm not sure carriers can do a much better job supporting IP telephony than I can."**

Rod White, vice president of telecommunications, Home Shopping Network

Bell Atlantic, which is trying to become a long-distance power player, does plan to support voice-over-IP services in the future.

While Bell Atlantic will continue to use its existing access network to deliver phone calls to customers, it will convert circuit-switched voice traffic to ATM for long-haul connections.

The company says it plans to start IP-voice service trials later this year, but would not give specific details.

LEC plans

Local exchange carriers SBC and BellSouth are following a similar path — the one taken by AT&T and MCI WorldCom.

SBC has made a commitment to provide packetized voice to customers through its \$6 billion network upgrade program known as Project Pronto. The program calls for wiring customer sites with digital subscriber line (DSL) and running multiple packet-based phone links plus data over a single connection.

SBC is relying on ATM for its new backbone, which will handle voice and data.

ATM will eventually run to customer sites over the DSL lines, and IP voice channels will travel over that ATM stream, says Fred Chang, vice president of SBC Advanced Solutions. SBC's voice-over-DSL services will start to emerge later this year with trials in Los Angeles and Houston.

Similarly, BellSouth is exploring packet voice as a way to sell additional phone services over DSL connections.

grated IP voice and data services when the voice-over-IP part of the offerings becomes invisible and painless, says Mark Winther, vice president of worldwide telecommunications at IDC.

While most of the traditional telecommunications companies are embracing IP as the wave of the near future, this by no means forecasts the death of the public switched telephone network (PSTN) as we know it today.

"The PSTN will be around for at least a decade and maybe more," MCI WorldCom's Nigro says.

MCI WorldCom will continue to make investments in circuit-switched voice to ensure QoS standards, but the majority of its capital investments will go into next-generation networks, Nigro says.

And most of the industry is following suit. ■

Internet telephony trends

Strong user interest in voice-over-IP (VoIP) technology...

Companies "very likely" to implement VoIP technology:

Based on survey of 500 companies.

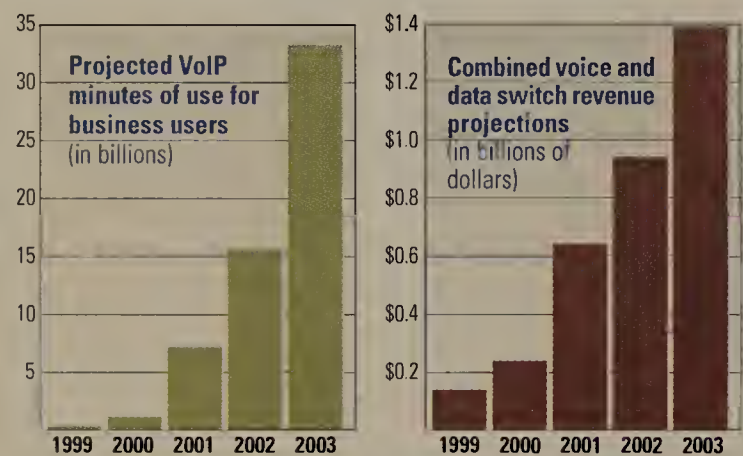
2000

2002

13%

60%

... has prompted industry analysts to predict big things in the markets for VoIP usage and equipment.



SOURCES: PHILLIPS GROUP INFOTECH, PARSIPPANY, N.J.; IDC, FRAMINGHAM, MASS.

tions services at Giga Information Group, a Cambridge, Mass., consulting firm.

"But because big businesses get such great rates now, it is going to be hard for the carriers to compete on price. The carriers will be adding a lot of bells and whistles to their offerings to attract customers," she says.

Despite the promise of voice-over-IP services, one

Oct. 29, 1999, page 55).

Nevertheless, most local and long-distance service providers have some kind of voice-over-IP blueprint, even though some of those services may not be pure IP.

Most traditional carriers considering voice-over-IP services are actually running IP traffic over ATM networks because ATM provides quality-of-service (QoS) guarantees

Clarifications

Our recent feature "Secrets of the tariff game" (Dec. 13, 1999, page 58) omitted contact information for the author. Brett Machtig can be reached at Machtig1@aol.com or (612) 325-9999.

A recent article (Dec. 13, 1999, page 14) should have stated that Computer Associates' (CA) new InterBiz e-business applications division was formed by bringing several existing CA business units under one umbrella.

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2. P: What is your primary job function? (check ONE only)
S: What is your secondary job function? (check ALL that apply)

P ☐ 1. ☐ Network Management S ☐ 2. ☐ LAN Management S ☐ 3. ☐ Datacom/Telecom Management S ☐ 4. ☐ IS/IT/MIS/CIO/CTO/Systems Management	P ☐ 5. ☐ Internet/Intranet/e-Commerce Mgmt, Webmaster S ☐ 6. ☐ Engineering Management	P ☐ 7. ☐ Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.) S ☐ 8. ☐ Consultant (Independent) S ☐ 9. ☐ Other (please specify) _____
--	--	--

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please print the appropriate number code on the line next to each product category. Please complete ALL categories A-N.)

1. \$100 Million or more 2. \$50 Million to \$99.9 Million 3. \$25 Million to \$49.9 Million 4. \$10 Million to \$24.9 Million 5. \$1 Million to \$9.9 Million 6. \$100,000 to \$999,999 7. \$50,000 to \$99,999 8. Under \$50,000 9. None of the above	A _____ Large Systems (Mainframes/Minis) B _____ Desktops (Micros/Laptops/Workstations/PDAs) C _____ Servers D _____ LANs E _____ WAN Equipment F _____ Carrier Services	G _____ Internetworking H _____ Internet I _____ Intranet J _____ Extranet/Ecommerce K _____ Remote Access L _____ Peripherals (including storage) M _____ Software N _____ Service/Support
---	---	--

4. What is the total number of sites for which you have purchase influence? (check ONE only)

1. ☐ 100+	2. ☐ 50 - 99	3. ☐ 20 - 49	4. ☐ 10 - 19	5. ☐ 2 - 9	6. ☐ 1	7. ☐ None
----------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-----------------------------------	-------------------------------	----------------------------------

5. What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization? (check ONE box in each column)

SERVERS		CLIENTS		LANs	
At Location	Entire Org.	At Location	Entire Org.	At Location	Entire Org.
A ☐ 1. 50,000+	B ☐	C ☐ 1. 50,000+	D ☐	E ☐ 1. 50,000+	F ☐
☐ 2. 10,000 to 49,999	☐	☐ 2. 10,000 to 49,999	☐	☐ 2. 10,000 to 49,999	☐
☐ 3. 1,000 to 9,999	☐	☐ 3. 1,000 to 9,999	☐	☐ 3. 1,000 to 9,999	☐
☐ 4. 100 to 999	☐	☐ 4. 100 to 999	☐	☐ 4. 100 to 999	☐
☐ 5. 50 to 99	☐	☐ 5. 50 to 99	☐	☐ 5. 50 to 99	☐
☐ 6. 10 to 49	☐	☐ 6. 10 to 49	☐	☐ 6. 10 to 49	☐
☐ 7. 1 to 9	☐	☐ 7. 1 to 9	☐	☐ 7. 1 to 9	☐
☐ 8. none	☐	☐ 8. none	☐	☐ 8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check ONE only) CORPORATE: 1. ☐ Entire Enterprise/Multiple Enterprises 2. ☐ Division/Multiple Divisions 3. ☐ Department 4. ☐ None	B. Involvement (check ALL that apply) 1. ☐ Create Network/IT Strategy 2. ☐ Recommend/Specify Brand 3. ☐ Approve Purchase 4. ☐ Evaluate Products/Services 5. ☐ Determine the Need 6. ☐ None
---	---

7. What is the estimated number of employees at your location/in entire organization? (check ONE in each section)

A. At your location:		B. Entire organization:	
1. ☐ Over 20,000	6. ☐ 500 - 999	1. ☐ Over 20,000	5. ☐ 1,000 - 2,499
2. ☐ 10,000 - 19,999	7. ☐ 250 - 499	2. ☐ 10,000 - 19,999	6. ☐ 500 - 999
3. ☐ 5,000 - 9,999	8. ☐ 100 - 249	3. ☐ 5,000 - 9,999	7. ☐ 499 or less
4. ☐ 2,500 - 4,999	9. ☐ 99 or less	4. ☐ 2,500 - 4,999	
5. ☐ 1,000 - 2,499			

8. Please indicate the Internet/Intranet/LAN/WAN products/services that you are currently involved in purchasing or plan to purchase (check ALL that apply)

A. Currently involved in purchasing		B. Plan to purchase	
INTERNET/INTRANET			
A ☐ 01. ☐ VPN Equipment	A ☐ 07. ☐ Voice/Video Over IP (IP Multicast Routing)	A ☐ 12. ☐ Management/Monitoring Software	
☐ 02. ☐ VPN Services	☐ 08. ☐ Internet Services	☐ 13. ☐ Web Based Management Tools	
☐ 03. ☐ Firewalls/Security/Encryption	☐ 09. ☐ Web Hosting	☐ 14. ☐ Web Based Collaboration/Groupware	
☐ 04. ☐ Electronic Commerce	☐ 10. ☐ Host Access	☐ 15. ☐ Caching/Load Balancing Products	
☐ 05. ☐ Web Servers/Software	☐ 11. ☐ Web Development Tools	☐ 16. ☐ Other Internet/Intranet	
☐ 06. ☐ Web Enabled Call Center Tools			
LOCAL-AREA NETWORKS/INTERNETWORKING			
A ☐ 17. ☐ Local-Area Networks	A ☐ 25. ☐ Layer 2 Switches	A ☐ 33. ☐ UPS	
☐ 18. ☐ Network Operating System Software (NOS)	☐ 26. ☐ Layer 3 Switches	☐ 34. ☐ Network Interface Cards (NICs,PCMCIA)	
☐ 19. ☐ Intel Based Servers	☐ 27. ☐ Layer 4 Switches	☐ 35. ☐ Hubs/Intelligent Hubs/Stackable Hubs	
☐ 20. ☐ Intel Based Multiprocessor Servers	☐ 28. ☐ ATM Switches	☐ 36. ☐ Cables,Connectors, Baluns	
☐ 21. ☐ RISC Based Servers	☐ 29. ☐ Token-Ring Switches	☐ 37. ☐ SNMP Platform	
☐ 22. ☐ Clustered Servers	☐ 30. ☐ Network Storage (NAS, SANs)	☐ 38. ☐ Management Frameworks	
☐ 23. ☐ Print Servers	☐ 31. ☐ Storage/Backup (Optical, Disk, Tape, RAID)	☐ 39. ☐ Other LAN/Internetworking	
☐ 24. ☐ Routers	☐ 32. ☐ Network Test/Diagnostic Tools		
WAN EQUIPMENT & SERVICES			
A ☐ 40. ☐ Modems	A ☐ 46. ☐ Remote Access Services	A ☐ 53. ☐ PBXs	
☐ 41. ☐ Cable Modems	☐ 47. ☐ Wireless Data Equipment/Services	☐ 54. ☐ Videoconferencing	
☐ 42. ☐ Asynchronous Transfer Mode (ATM)	☐ 48. ☐ ISDN Equipment/Services	☐ 55. ☐ Managed LAN/Router Services	
☐ 43. ☐ Frame Relay Equipment Including FRADS	☐ 49. ☐ FT-1/T-1/T-3 Services	☐ 56. ☐ Fax Servers/Services	
☐ 44. ☐ Frame Relay Services	☐ 50. ☐ xDSL Services/Products	☐ 57. ☐ Other WAN Equipment/Services	
☐ 45. ☐ Remote Access Products	☐ 51. ☐ Diagnostic/Test Equipment		
	☐ 52. ☐ DSU/CSU	None of the above (1 - 57)	A ☐ 58. ☐ B

9. Please indicate the Network hardware/software/services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing		B. Plan to purchase	
COMPUTERS/PERIPHERALS			
A ☐ 01. ☐ Laptops/Notebooks/PDAs	A ☐ 05. ☐ Storage/Backup (Optical,Disk,Tape,RAID)	A ☐ 08. ☐ Minis	
☐ 02. ☐ PCs	☐ 06. ☐ Printers	☐ 09. ☐ Mainframes	
☐ 03. ☐ Windows Terminals/Thin Clients	☐ 07. ☐ Printer/Fax/Copier Hybrids (Multifunction Printers)	☐ 10. ☐ Fax/Modem Boards	
☐ 04. ☐ Workstations		☐ 11. ☐ Memory/Chips/Boards/Cards	
		☐ 12. ☐ Other Computers/Peripherals	
SOFTWARE/APPLICATIONS			
A ☐ 13. ☐ Network Management	A ☐ 21. ☐ E-Mail	A ☐ 28. ☐ Site Metering Tools	
☐ 14. ☐ Systems Management	☐ 22. ☐ Enterprise Resource Planning (ERP)	☐ 29. ☐ Data Warehousing	
☐ 15. ☐ Security	☐ 23. ☐ EDI	☐ 30. ☐ Anti Virus Software	
☐ 16. ☐ Directory Services	☐ 24. ☐ Desktop Videoconferencing	☐ 31. ☐ Multimedia	
☐ 17. ☐ Operating Systems	☐ 25. ☐ Imaging	☐ 32. ☐ Y2K Conversion Software	
☐ 18. ☐ Applications Development Tools	☐ 26. ☐ Middleware/Serverware	☐ 33. ☐ Helpdesk	
☐ 19. ☐ Database Management/RDBMS	☐ 27. ☐ Document Management	☐ 34. ☐ Other Software/Applications	
☐ 20. ☐ Groupware			
SERVICES			
A ☐ 35. ☐ BPO (Business Process Outsourcing incl. Financial Services, HR, Logistics etc.)	A ☐ 36. ☐ Applications Outsourcing	A ☐ 39. ☐ Education/Training Services	
	☐ 37. ☐ Call Center Outsourcing	☐ 40. ☐ Other Services	
	☐ 38. ☐ Systems Integration/Consulting	None of the above (1 - 40)	A ☐ 41. ☐ B

10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)

A. Currently installed		B. Planned for purchase	
NETWORK PROTOCOLS			
A ☐ 01. ☐ TCP/IP	A ☐ 04. ☐ Novell IPX/SPX	A ☐ 07. ☐ NFS	
☐ 02. ☐ IPv6	☐ 05. ☐ APPC/APPN/LU 6.2	☐ 08. ☐ SNMP	
☐ 03. ☐ SNA	☐ 06. ☐ NETBIOS/NETBUEI	☐ 09. ☐ Other Network Protocols	
LAN/WAN ENVIRONMENT			
A ☐ 10. ☐ Gigabit Ethernet	A ☐ 16. ☐ IP Switching	A ☐ 22. ☐ Wireless	
☐ 11. ☐ Switched Ethernet	☐ 17. ☐ Layer 3,4 Switching	☐ 23. ☐ DSL	
☐ 12. ☐ Fast Ethernet	☐ 18. ☐ FDDI	☐ 24. ☐ ISDN	
☐ 13. ☐ Ethernet	☐ 19. ☐ 100Base-T	☐ 25. ☐ Frame Relay	
☐ 14. ☐ ATM	☐ 20. ☐ 10Base-T	☐ 26. ☐ Private Line T1, T3, FT-1, SONET	
☐ 15. ☐ Token Ring/Token Ring Switching	☐ 21. ☐ Fibre Channel	☐ 27. ☐ Other LAN/WAN Environment	
NETWORK OPERATING SYSTEM			
A ☐ 28. ☐ Windows NT/Windows 2000	A ☐ 32. ☐ LINUX	A ☐ 35. ☐ IBM (LAN Server)	
☐ 29. ☐ Novell (NetWare 5.X)	☐ 33. ☐ Microsoft (LAN Manager)	☐ 36. ☐ Other Network Operating System	
☐ 30. ☐ Novell (NetWare 4.X)	☐ 34. ☐ Banyan (Vines)		
☐ 31. ☐ Novell (NetWare 2.X,3.X)			
COMPUTER OPERATING SYSTEM			
A ☐ 37. ☐ NT Workstation	A ☐ 42. ☐ LINUX	A ☐ 47. ☐ Digital VMS	
☐ 38. ☐ Windows 2000	☐ 43. ☐ DOS	☐ 48. ☐ Macintosh	
☐ 39. ☐ Windows 98/95/3.1	☐ 44. ☐ OS/2,OS/2 Warp	☐ 49. ☐ Other Computer Operating System	
☐ 40. ☐ Intel based UNIX	☐ 45. ☐ OS/400		
☐ 41. ☐ RISC based UNIX (incl. SOLARIS)	☐ 46. ☐ IBM MVS/VM/SE/ESA	None of the above (1- 49)	A ☐ 50. ☐ B

11. Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Mainframes (Large Scale)	B - Minis (Midrange)	C - Workstations
1. ☐ IBM	1. ☐ IBM RS/6000	1. ☐ Sun Microsystems
2. ☐ Other	2. ☐ IBM AS/400	2. ☐ H-P
	3. ☐ Digital/Tandem/Compaq	3. ☐ Digital/Compaq
	4. ☐ Unisys	4. ☐ IBM
	5. ☐ H-P	5. ☐ Silicon Graphics
	6. ☐ Other	6. ☐ Other

12. What is the estimated gross revenue of your entire company/institution? (check ONE only)

1. ☐ \$20 Billion or More	5. ☐ \$100 Million to \$499.9 Million	9. ☐ \$4.9 Million or less
2. ☐ \$10 Billion to \$19.9 Billion	6. ☐ \$50 Million to \$99.9 Million	10. ☐ None of the above
3. ☐ \$1 Billion to \$9.9 Billion	7. ☐ \$10 Million to \$49.9 Million	
4. ☐ \$500 Million to \$999.9 Million	8. ☐ \$5 Million to \$9.9 Million	

13. For which areas outside of the US do you have purchase influence? (check ALL that apply)

1. ☐ Europe	3. ☐ South America	5. ☐ Middle East	7. ☐ Canada
2. ☐ Asia	4. ☐ Australia	6. ☐ Africa	8. ☐ None

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TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

Allied Telesyn later this month will release an unmanaged 10/100M bit/sec Ethernet switch with gigabit uplinks. The AT-FS909SX has eight Fast Ethernet ports and a 1000Base-SX uplink. The company says the switch is the first in a series and costs \$923.

Allied Telesyn: www.alliedtelesyn.com

Alteon WebSystems last week started shipping the first Gigabit Ethernet adapters for Category-5 copper cabling. At \$495, the adapters cost half as much as fiber-optic versions, the company says. The ACEnic 10/100/1000-Base-T adapters automatically negotiate with the other end of the connection for the best possible rate. Drivers support Windows NT, NetWare, Linux and other operating systems.

Alteon: www.alteonweb.com

Linksys has unveiled a broadband Ethernet router that works over cable TV and digital subscriber line (DSL) networks. The EtherFast Cable/DSL Router lets users access the Internet by connecting their PCs to cable or DSL modems. The router features a four port 10/100M bit/sec Ethernet switch and assigns up to 253 private IP addresses, Linksys says. The EtherFast Cable/DSL Router costs \$199 and is available now.

Linksys: www.linksys.com

Bus-Tech is rolling out a version of its EnterpriseExpress Adapter for IBM DB2 Access. This PCI card fits into an S/390 Enterprise System Connection (ESCON) slot and lets Windows NT users tap into a DB2 main-frame database.

EnterpriseExpress Adapter is available now for \$15,000.

Bus-Tech: www.bustech.com

Fireworks expected at NOS showdown

BY JOHN FONTANA

The one thing guaranteed as the new year begins is that by the time the year ends, network operating system developments will be one of 2000's top stories.

Volumes will be written about the operating system, given that Microsoft's Windows 2000 will finally be available, and Linux is starting to gain credibility in the enterprise.

And don't discount Novell, which is remaking NetWare to complement the Web, and Unix, which continues to run along at its reliable pace.

So what better way to start the year than to get the vendors to sit down and extol the virtues of their wares and defend the weaknesses in their products?

And what better forum for that discussion than *Network World's* Network Operating System Showdown? IBM, Microsoft, Novell, The Santa Cruz Operation (SCO) and Red Hat Software will convene at ComNet 2000 on Wednesday, Jan. 26 in Washington, D.C., to face questions from a panel of experts, each other and audience members.

With e-commerce spreading operating system responsibilities beyond the firewall, there will be plenty of debate about which company has the right stuff to scale to the number of users the Web will bring.

This year, IT executives are likely to evaluate their operating systems in an effort to harden their infrastructures to handle those external users as well as traditional internal chores. For many, the question will not be which is the best operating system, but how to make them all work together — whether they are handling file and print services, controlling the network, hosting applications or supporting Web commerce.

Vendors to clash at ComNet 2000: NOS Showdown

When: Wednesday, Jan. 26; 1-2:15 p.m.

Where: ComNet 2000; Grand Ballroom, Renaissance Hotel, Washington, D.C.

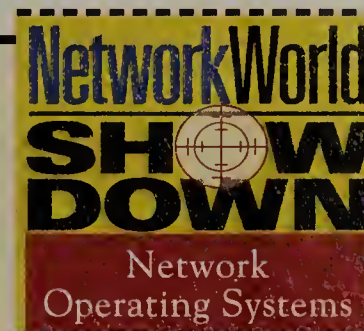
Moderator: John Gallant, editorial director, *Network World*

Expert panelists:

- John Fontana, senior editor, *Network World*
- Dave Kearns, noted technology writer and author

Participants:

- Kim Clark, director of the Core OS Platform Group, Novell
- Aubrey Edwards, group product manager, Microsoft
- Tom Keith, director of Unix market development, IBM
- Tamar Newberger, director of server product marketing, The Santa Cruz Operation
- Erik Troan, director of engineering, Red Hat Software



John Fontana



Dave Kearns

At the showdown, these topics are likely to generate more friction than the Democrats and the Republicans can muster in an entire legislative session.

That's because IT executives will come armed with questions about interoperability, security, scalability, specialized deployments, standard and API support, and total cost of ownership.

For example, Julia Goldberg, executive vice president of corporate technology services for Razorfish.com, wants to know the level of commitment each vendor has to open standards. Goldberg's network includes Windows NT, NetWare

and Unix, and she wants those systems to play together nicely. She is especially concerned about Microsoft's implementation of the Kerberos authentication standard in Win 2000, which includes some proprietary extensions that erode its level of interoperability.

Craig Zimmer, network systems engineer at the University of North Carolina at Chapel Hill, wants to know what vendors are doing to promote application development. He is especially interested in Novell's efforts. "What are they doing to bring developers on board to write to their platform?" Zimmer asks. ▣

Novell utility eases directory integration

BY DENI CONNOR

PROVO, UTAH — NetWare users will soon be able to merge two dissimilar network directories with a new utility from Novell.

The company is previewing TREEINT, a directory integration utility, in the January release of its Novell Developer Kit.

TREEINT integrates directories with different schemas at any location in the directory tree, thus expanding the opportunity for directory integration. At present, Novell distributes DSMERGE, a utility that lets network professionals merge directories that have identical structures or schemas only at the root of the directory.

TREEINT analyzes directory trees, compares their schemas and attempts to

reconcile any differences. It then backs up the data in the new tree, installs the new directory into the existing tree and restores the data.

"TREEINT would be particularly useful for companies that want to repartition their directories or for companies that have purchased other companies and need to combine directories with different schemas," says Ed Partridge, IS manager for medical component manufacturer Zevex in Salt Lake City.

Novell declined to comment on whether the utility will ship with future releases of NetWare. TREEINT runs as a NetWare Loadable Module on NetWare 4 and 5 networks.

It is available for download free from developer.novell.com/ndk/. Novell: www.novell.com

www.nwfusion.com

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With Windows 2000, NT grows up

It's more stable, performs better and is easier to manage, but not all desktops are welcome at this party.

BY THOMAS
HENDERSON

The long-awaited successor to Windows NT is finally seeing the light of day. We tested the final code Microsoft shipped to manufacturing late last month. Most of the bells and whistles work as advertised, but planning for, testing and deploying Windows 2000 is going to be a slow and daunting process.

We looked at Windows 2000

NetResults

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Pros

- ▲ Good group policy control.
- ▲ Comprehensive security in Windows 2000-only environments.
- ▲ Strong, standards-based directory infrastructure.
- ▲ Better performance than Windows NT.

Cons

- ▼ Requires serious planning to reap benefits.
- ▼ Only Windows 2000 clients get full features of Active Directory.
- ▼ Requires a Client Access License for each authenticated client.

Server and Advanced Server editions. Enterprise installations won't reap the full benefits from server upgrades unless they also put Win 2000 on all their desktop machines. Most of the useful features of Windows 2000 Server — IntelliMirror, group policy management and Kerberos security — are confined to networks that are homogeneously Win 2000.

Active Directory is central

to security, resource access, IntelliMirror features, administrative control and the availability of network resources. You can correct mistakes and manipulate Active Directory information easily using Active Directory Microsoft Management Console (MMC) snap-ins, but you're better off getting it right the first time.

Each Win 2000 server can play one of three roles in the Active Directory infrastructure: stand-alone server, member server or domain controller.

Servers can run in a mixed NT and Win 2000 mode or in native Win 2000 mode, which precludes relationships with NT domains except through directory brokerage services. Running Win 2000 in "native" mode removes many of the widely publicized NT/LAN Manager security problems and will make access to resources quicker and easier for end users and administrators.

Because the directory service is based upon an extension to the Internet Domain Name System, DNS must be present and working on the network where a domain controller for Active Directory is deployed. If you don't have a DNS infrastructure in place, you can install the service that is bundled with Windows 2000 Server editions. We suggest examining the settings Microsoft chooses for the domain name server because several times we found the settings weren't correct for intranet deployments.

A Microsoft utility called Lightweight Directory InterFace can import Lightweight Directory Access Protocol information from any LDAP-enabled directory into Active Directory. There are many Active Directory fields to populate. With any luck, you will already have that information sitting in a database somewhere on your network. However, even importing existing data can raise issues because the directory fields available with NT 4.0 fill only a fraction



of Active Directory's fields.

MMC is the administrative nexus for the directory. It's considerably easier to use than the cadre of tools required to manage NT domains.

Mirror, mirror

Once you have Active Directory in place, you can begin to deploy IntelliMirror, a group of server and client-side features that help manage desktop configurations.

With IntelliMirror's client-side file/folder caching service for mobile users, you can make server folders available offline by caching them on the desktop machine. You can set IntelliMirror to synchronize the cache on a user's desktop at logon, logoff or during idle time on the host PC.

We tested this feature extensively and found that while it offers enormous convenience, it's not a substitute for workgroup/activity management environments such as Lotus Notes or Microsoft Exchange. IntelliMirror is hampered by several practical limitations, including the datalink speed of a mobile connection. We found that synchronization at logon or logoff tested our patience.

IntelliMirror also supports roaming user profiles, allowing Win 2000 desktop settings to be cached on a server. That means you can log on to a different machine and still see your own desktop icons.

The drawback of this scheme is that applications are not available unless they've been packaged and published by a network administrator.

The portable desktop worked fairly well in our environment. It took Word and Excel 2000 12 minutes to download onto an otherwise empty Win 2000 PC over a Fast Ethernet intranet.

Security

An important consideration for any network operating system is security.

The Kerberos system in Win 2000 generates Ticket Granting Tickets when a user logs on to

ScoreCard

Windows 2000 Server

Administration 30%	9
Performance 20%	8
Features 20%	9
Security 10%	8
Installation 10%	9
Documentation and support 10%	7
Total score	8.50

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

Active Directory. The tickets are used as shortcuts to authenticate users to other domain controllers without forcing them to log on again.

Win 2000 supports a file-signing service called Authenticode, which verifies that a file hasn't been tampered with. If your users are running Internet Explorer, you can screen software downloads through the Active Directory group policy mechanism.

A new Encrypting File System lets users encrypt their files and folders. The process of decrypting files is transparent to the user. Fortunately, the administrator gets a data recovery certificate so files can be decrypted upon the untimely exit of a user. We found that Encrypting File System worked easily but would prefer that the service was not available by default.

With Win 2000, you can also delegate administration tasks based on Active Directory groups. It's possible to create administrative authorities for specific individuals by making them part of groups within the directory.

Performance and availability

Microsoft has made several improvements in performance and availability.

We tested file I/O using Windows 2000 Professional edition clients against differing servers with bulk folder and file copying. We found performance of both Windows 2000

Server editions to be comparable for gigabyte file transfers and approximately 18% faster than the exact same platform using NT 4.0 with Service Pack 5 applied.

Win 2000 lets you cluster two nodes in the Advanced Server edition for high availability. We found connecting two Compaq 3000R servers together into a cluster was surprisingly simple. Unfortunately, few applications can take advantage of Microsoft's clustering.

We ran Microsoft SQL Server 7 with Service Pack 1 on our cluster. When we simulated a server failure, the surviving member of a cluster took just 30 seconds to pick up the duties of the failed server. That is a 20% reduction in failover time over a similar test conducted on a pair of NT 4.0 servers.

Microsoft has simplified the installation process. We tested Windows 2000 Server and Advanced Server on several platforms. This simplification is due mainly to new plug-and-play support that enables hardware discovery and integration.

Microsoft has finally delivered on a long list of features that it began building more than five years ago. Making appropriate choices on how you will use Win 2000 in your enterprise network is going to take some time. And although it's possible to drop a Win 2000 server into an existing network, we don't recommend doing so until you've jumped through every planning hoop possible.

Henderson is principal researcher at ExtremeLabs in Indianapolis. He can be reached at thenderson@compuserve.com.

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HELP DESK

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Infrastructure

Kevin Tolly

WHAT'S YOUR BANDWIDTH BUDGET?

With Y2K worries over, you can finally turn up the heat on long-neglected projects. If industry analysts are correct, renting applications from application service providers (ASP) will be a focus of activity. But as you draw up your plan and rough out your budget, don't forget about including WAN bandwidth.

It's tough to find information about how much bandwidth one should allot each user when implementing thin-client networking to deliver rented applications. In fact, neither thin-client giant Citrix nor its major licensee, Microsoft, spend much time addressing the issue. Scouring through various technical and marketing offerings reveals that the vendors believe 20K bit/sec per user is a good rule of thumb.

So let's consider our options for deploying applications to a contingent of 50 simultaneous users. Accepting 20K bit/sec as valid would allow a single T-1 to support some 75 users (20K bit/sec x 75 = 1.5M bit/sec). Supporting our hypothetical group of 50 would require only 1M bit/sec of capacity.

But what would happen if the 20K bit/sec rule of thumb were wrong? The Tolly Group conducts ongoing research in the area of thin-client networking and, according to our research, that number is rarely accurate.

In fact, our studies of Microsoft Office applications accessed via thin clients across a T-1 showed moderately paced typing with several applications open triggering streams that, for example, averaged 97K bit/sec with peaks of 122K bit/sec. With this average, the T-1 link would fill up with just 15 simultaneous users. Allowing for the peak would knock that number down to 12 users.

Imagine now that the T-1 you thought was overkill for 50 users could, in reality, only support a dozen Microsoft Office users. What does that added WAN expense do for the bottom-line benefits you thought server-based computing would deliver?

Where did the 20K bit/sec number come from? That is a question I cannot answer. Is it possible for applications to run within the 20K bit/sec window? For average consumption, the answer is yes. Some client scenarios we ran clocked in at 9K and 18K bit/sec. Still, these applications were troublesome because their

runs showed peaks of 90K and 122K bit/sec, respectively.

If you are a bit bewildered by this situation, take a moment to consider the heritage of thin-client computing. Some 10 years ago, Citrix developed its Independent Computing Architecture (ICA) protocol to off-load processing —

not bandwidth — from low-end machines. Early on, Citrix allowed Windows 3.1 applications to run on DOS machines.

Today, the ICA protocol enjoys a well-deserved renaissance courtesy of the ASP movement. With that in mind, however, one thing is clear — no plan is com-

plete until the WAN bandwidth budget for rented applications is figured in.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com



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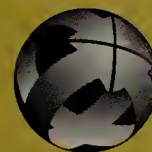
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IP Multicast still waiting for takeoff

BY JASON MESERVE

During the 1980s and early 1990s, cellular telephone technology had limited reach and use. Fast forward to 2000, and it seems everyone owns a cell phone.

IP Multicast today is the same as early cell phone technology — useful and available, but not ubiquitous.

Though it has distinct bandwidth-saving advantages over other modes of transmission, IP Multicast has not taken off like many had predicted when the technology was first introduced in Steve Deering's doctoral dissertation in 1988.

Multicast technology can be used to send data — such as streaming media, stock quotes or inventory updates — simultaneously from one-to-many or many-to-many sources, be it server to client or application to application. Unlike the more widely used unicast technology, which employs a separate connection for each user, multicast has a single connection for every user.

The technology can reduce traffic on the corporate network by eliminating redundant access to the same content. Multicast can also reduce the load placed on network servers.

Despite its advantages, there are a number of obstacles preventing IP Multicast from becoming a dominant means of data delivery. For multicast to work, every router and switch between the source (usually a server) and the destination (typically as desktop) must be multicast-enabled.

That fact can be a problem for companies that have lots of older network gear.

"A lot of these enterprises are a mixed bag in terms of what they have for equipment," says Stan Schatt, research director at Giga Group. "There is still something like 6% of companies with token ring. A lot of networks still have hubs, not switches."

Most of the new high-end Layer 3 switches from the likes of Cisco, 3Com and Nortel Networks come with multicast support; it's just a matter of turning it on. "IP Multicast is a very important feature, not just a check-off item," says Esmeralda Silva, a research manager at International Data Corp. in Framingham, Mass. "When deploying any switch or router in a network that is going to distribute different types of data, you've got to support multicast."

Even for companies with multicast-enabled networks, there is a lack of management tools to ensure smooth operation.

"People are looking at the kind of management tools available in the enterprise. We have a couple, but there is no HP OpenView for multicast," says Christine Falsedti, product line manager for multicast and quality of service at Cisco. "People want to know how they're

A lack of management tools, interoperability issues and immature protocols slow the bandwidth-saving technology's growth.

implementation may vary from vendor to vendor, observers say.

"Some PIM implementations will not talk to other versions of PIM," says Jeremy Hall, an engineer at UUNET and an IETF member. "It's complex trying to get everyone to agree on how to implement the technology."

IP Multicast is also designed as an any-to-any model, which further complicates its implementation, says Rob Coltun, co-routing area director at the IETF. Currently, there are no real security measures that protect multicast traffic. "How do you ensure that any one

sender is allowed to send to a given group?" Coltun asks. This is especially problematic for a user on one ISP who wants to broadcast information to a group on another ISP, with a third ISP standing in the middle.

Also, because IP Multicast is broadcast over a reserved Class D IP address, there is some worry about its scalability. Multicast uses "routing trees" to determine its path through the network. Because Class D addresses are limited, Coltun fears there won't be enough addresses available if the technology becomes extremely popular.

But this is not to say IP Multicast isn't finding some roots.

Cisco, one of the leading proponents of IP Multicast, claims that 50% of Fortune 500 companies are using the technology for some form of content distribution. Any device that runs the company's routing software, IOS Version 10.2 and later, is multicast enabled, though the feature is not turned on by default.

Novell uses RealNetworks' RealSystem G2 to multicast company addresses made by CEO Eric Schmidt to every desktop in the company. "IP Multicast gives us bandwidth advantages during large-scale events," says

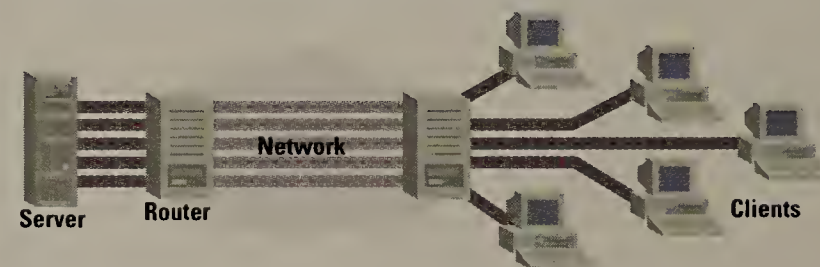
Benjamin Brimhall, manager of streaming media services. "The experience for the end user seems to be better reliability as well. When we go to view video, we don't have the lag, dropped packets, buffering . . . you don't run into the network congestion problems."

Brimhall says each broadcast runs between 80K and 200K bit/sec, depending on the event. The company streams audio and video at this rate over a WAN to its Provo, Utah, headquarters and offices in San Jose, which are connected by a T-3. Novell upgraded its network infrastructure 18 months ago to ensure everything is multicast-enabled.

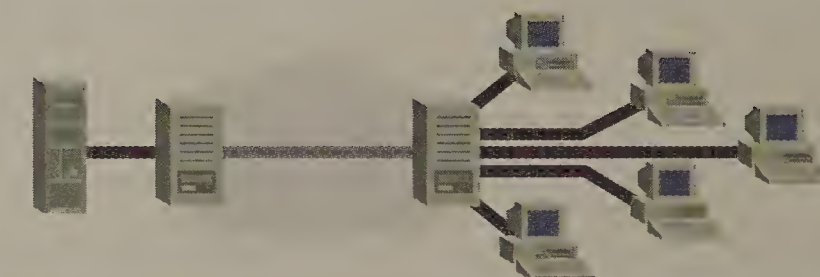
"Multicast is still moving forward," says the IETF's Coltun, who sees a combination of servers and services that combine unicast and multicast technologies to deliver data as efficiently as possible. Under this scenario, corporations can multicast data as far out on the network as possible, and then use unicast technology to reach those in areas that are not multicast-enabled. ▀

Multicast vs. unicast

- 1 Unicast technology requires separate connections to each client from the server, which can use up a lot of bandwidth if there is a large audience.



- 2 With multicast, a single stream can be picked up by each client, saving bandwidth. The catch: Each router between the server and client must be multicast-enabled.



going to manage multicast once they deploy it."

A bigger problem is IP Multicast over the Internet, where no single entity controls the entire infrastructure. Backbone service providers such as UUNET, Qwest and Sprint offer multicast in their networks, but smaller ISPs have been slower to implement the technology.

Part of the problem is technological. Protocols such as Multicast Border Gateway Protocol have been developed to help ease the transmission of IP Multicast traffic between two ISP networks but are still relatively immature.

To help spur the deployment of multicast, Cisco helped author Protocol Independent Multicast (PIM), which is currently an IETF Internet Draft. The primary benefits of PIM are that it does not rely on any routing protocol to work and is ideal for large or small enterprise networks. Other IP Multicast protocols rely on certain routing protocols, such as Routing Information Protocol or Open Shortest Path First.

As happens with many "standards" however, PIM's



Carriers & ISPs

The Internet, Extranets, Interexchange
and Local Carriers, Wireless, Regulatory Affairs

Briefs

The Federal Communications Commission last week named **David Farber**, a telecommunications professor at the University of Pennsylvania, as its chief technologist. Farber will replace **Stagg Newman**, who steps down Jan. 14. According to an FCC statement, Newman is moving to North Carolina for family reasons and will become Senior Telecommunications Practice Expert at consulting company McKinsey and Co. Farber heads the Center for Communications & Information Science & Policy and the Laboratory for Distributed Systems at Penn. He directs research in ultra-high-speed networking, computer architecture design and distributed collaboration methodology.

Covad Communications and **Pacific Bell** have worked out an automated ordering process to speed provisioning of circuits for digital subscriber line (DSL). DSL carrier Covad must lease lines from the local phone company, so any streamlining of the ordering system can cut the time between customers ordering service and actually getting it. The companies claim it cuts loop-ordering time by 25% and is less expensive for PacBell than completing order forms. Covad hopes to do the same with other local carriers.

Covad: www.covad.com

FutureLink is now playing with the big boys. Last week the San Francisco application service provider (ASP) moved its trading stock from a bulletin board trading site to **NASDAQ**. The stock opened at \$30 per share, but was selling slightly lower midweek due to an overall drop in stock markets around the world. Of the ASPs that make up the ASP Consortium's more than 250 members, only about 25% trade shares publicly.

FutureLink: www.futurelink.net

ASPs still searching for the right mix

BY DENISE PAPPALARDO

Vendors from all corners of the technology arena are jumping through hoops to be part of the developing application service provider (ASP) market. And in some cases, this means they're struggling to forge new identities while keeping their old ones intact.

Why this monumental effort? Market research firms are projecting a substantial revenue opportunity for ASPs. Dataquest in San Jose predicts the ASP market will create revenue reaching \$22.7 billion by 2003. Companies such as AT&T, Intel, MCI WorldCom, Microsoft, Oracle and Sprint want a piece of that billion-dollar pie. Yet most vendors are still trying to figure out what application service model works best for them and their customers.

In November, Microsoft stepped into the hosted applications business through the creation of the Microsoft Office Online partnership program. Through the program, 15 service providers have agreed to host Microsoft Office 2000 software for business users. Pricing and target customers are chosen by individual service providers, which include Concentric Network, FutureLink, TeleComputing and USinternetworking. These service providers will offer their customers access to hosted Word, Excel or Access applications over the Internet, says George Meng, a Microsoft product manager.

Despite this program's launch, Microsoft seems to be struggling with how to cope with hosted applications and

how to best address the market. It believes users at midsize to large companies will continue storing Microsoft applications locally. A business traveler may want Word or Excel right on his machine rather than dial in to an ASP for access, Meng says.

Plus, Microsoft believes some users might prefer buying the applications outright rather than from an ASP. So Microsoft plans to sell hosted Office applications directly to small business users through its bCentral portal (www.bcentral.com). In a sense, that will make Microsoft a competitor to its 15 Microsoft Office Online program

partners. However, Microsoft has yet to determine how to set up software licensing on bCentral. Whether Microsoft or customers would own the Office 2000 software license is not clear.

The software giant is viewing the application services market conservatively. "We do believe it is an emerging market and not something people will be switching to wholesale overnight," Meng

says. "It will be two to five years before more significant changes will happen."

Oracle seems to have a clearer handle on how to provide hosted applications. That's probably because Oracle isn't worried about cannibalizing its customer base by providing hosted applications, says John Repko, vice president of operations for Oracle Business Online.

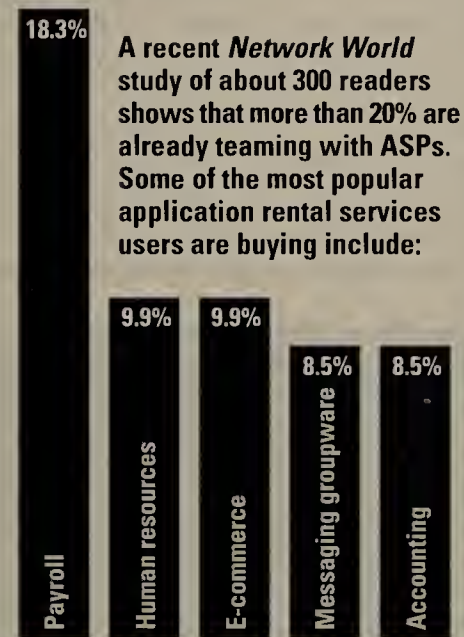
Repko maintains the small to midsize business companies Oracle Business Online targets would otherwise not be Oracle customers. They couldn't afford the cost of buying, implementing and maintaining Oracle's high-end enterprise resource

planning (ERP) and customer relationship management (CRM) applications.

What's more, Oracle Business Online offers no software customization, although the base software is the same. That means most Fortune 500 companies, because they change the source code of their ERP or CRM applications upon implementation, will find it virtually impossible to host

See **ASPs**, page 26

Top applications



A recent *Network World* study of about 300 readers shows that more than 20% are already teaming with ASPs. Some of the most popular application rental services users are buying include:

Start-up touts low-cost connections over optical fiber

BY TIM GREENE

NORTH ANDOVER, MASS. — Quantum Bridge says it has tools to link computers that are miles apart via 10M bit/sec optical fiber connections that cost about the same as 1.5M bit/sec T-1s.

The 15-month-old company claims carriers that use its passive optical network gear can charge \$500 to \$1,000 per month for WAN access links at LAN speeds and still recoup their hardware investments within a year. Similar services today cost \$750 to \$2,000, depending on the carrier, bandwidth and dis-

tance between the customer and the service provider switching office.

"It's upping the ante here about how much bandwidth you can distribute affordably," says Rosemary Cochran, an analyst with Vertical Systems Group in Dedham, Mass.

Customers need inexpensive high-speed access technology that lets them take advantage of the mushrooming backbone capacity carriers have by virtue of advances in core network technologies such as dense wave division multiplexing, Cochran says.

Vertical Systems says 76% of businesses

with 75 employees or more are within a mile of optical fiber, making it possible for carriers to extend fiber directly to those potential customers.

Quantum Bridge equipment splits wavelengths of light into time slots so each wavelength can be shared by up to 32 customers. If customers need more bandwidth, they get it in 1.7M bit/sec chunks by adding time slots. Quantum Bridge says its gear gives carriers the option to let customers add and drop bandwidth using secure Web connections.

See **Quantum**, page 26

ASPs,
continued from page 25

an application with Oracle Online Business rather than buying the software from Oracle proper. And that, in turn, safeguards Oracle's traditional revenue source.

With the Oracle hosting service, a customer pays a software license fee based on the number of users who will access the application but doesn't worry about maintaining the application. Instead, the customer pays Oracle Business Online a monthly service charge.

Oracle's ASP model differs from the approach taken by competitors such as Corio and TeleComputing, both of which bundle the software licensing fees into monthly bills. While ASPs own the software license, customers own the content, these providers say.

Traditional data service providers make obvious ASPs, but that doesn't mean hosting applications come naturally to players in this market segment.

Sprint follows one approach, AT&T and MCI WorldCom subscribe to another. In October, Sprint announced that it's teaming with Deloitte Consulting to

offer business users hosted ERP and CRM applications from software companies such as PeopleSoft, SAP and Siebel Systems. Sprint brings data center and network services expertise to the table, while Deloitte delivers application support and maintenance know-how.

Sprint and Deloitte will target Fortune 500 customers rather than smaller companies. They'll do so by pitching customization of the hosted applications. Users would likely pay a premium for the tweaks because that software could not be used for other users, flying in the face of the one-to-many hosted application model, says Meredith Whalen, an analyst at International Data Corp., in Framingham, Mass.

Meanwhile, AT&T is busily building data centers so it can host Web servers for business users and application servers for ASPs, says Oleh Danyluk, general manager of next-generation IP services at AT&T. In other words, AT&T will provide hosting facilities to ASPs rather than get into the ASP business directly.

UUNET is hosting application servers for providers such as TeleComputing, a worldwide ASP based in Fort Lauderdale, Fla. TeleComputing stores its appli-

cation and database servers exclusively at UUNET data centers, and customers can only use UUNET's dedicated Internet access services to get to rented applications.

Analysts predict more ASPs will align themselves with specific providers. In fact, Applicast, an ASP in Mountain View, Calif., mostly works with GTE Internet-working, while Portera, an ASP in Campbell, Calif., works exclusively with Intel Online. Intel Online? Yes, even chip and processor giant Intel wants a piece of the hosting pie. ■

Quantum,
continued from page 25

A QB5000 optical access switch at a carrier switching office assembles customer traffic on fiber strands and QB100 intelligent optical terminals at customer sites pick off just individual customers' traffic.

As the fiber branches out from the switching office to reach customers, the light is diverted using passive optical splitters and couplers that require no electronics. The system supports access links of 20 kilometers or more depending on how many customers are being fed by one wavelength.

Customers plug their LAN gear in to either T-1 ports or a 10/100M bit/sec Ethernet port on a QB100. Later releases of the equipment will feature Gigabit Ethernet, fiber channel and OC-3, OC-12 and OC-48 ports, the company says.

Scheduled to ship in June, the company's products cost \$7,000 per customer for 200 QB 100s supported by a fully loaded QB5000.

Quantum Bridge: www.quantumbridge.com

www.nwfusion.com

SOFTWARE GIANT=ASP?

Oracle and Microsoft have found their alter egos as application service providers. But what does each have to offer customers? We take you to their Web sites to find out.

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Eye on the carriers . David Rohde

NEW TELECOM ERA . . . SAME OLD AT&T TACTICS

Just before Christmas, the Federal Communications Commission freed Bell Atlantic to go into the long-distance business for its customers in New York.

The reaction? MCI WorldCom and Sprint said fine, let's compete. Many competitive local exchange carriers said OK, we'll just keep ordering local loops from Bell Atlantic. Users generally said the fewer restrictions, the better.

AT&T said we're gonna sue.

Well, isn't that just so 20th century of them?

Regular readers of this column know that one of the enduring truths about carriers is that they all say one thing on Wall Street and the opposite in Washington. If there was ever a more brazen example of this than AT&T's behavior at the end of 1999, I

can't think of it.

Not three weeks before the FCC's Bell Atlantic decision, AT&T's bigwigs gathered together hundreds of analysts in New York for a daylong brag-fest. They showed a TV ad now running in New York offering combined AT&T local and long-distance service to consumers. Then they projected that the number of such AT&T "all-distance" customers in the state would zoom from the current 100,000 to about 750,000 at year-end 2000 because of AT&T's brilliant marketing.

Yet when the FCC gave Bell Atlantic the long-distance nod, AT&T's lobbyists roared that Bell Atlantic's local-competition systems weren't up to the task. In their lawsuit, they claimed AT&T would now have to either abandon the New York local market or "ramp up its orders for local service"

at a time when Bell Atlantic's systems "will profoundly degrade AT&T's reputation for providing quality service."

So which is it, AT&T? Why are your marketing folks planning a huge local ramp-up if it's going to destroy the brand? Or is this just about AT&T wanting to continue charging a monthly fee on its best long-distance plans — something the Bells promise not to do?

But there are bigger issues involved here than either AT&T's or Bell Atlantic's parochial interests. Telecom's ridiculously outdated local/long-distance dichotomy has distorted everything from toll charges to area code arguments, and it's time to start getting rid of it.

And there are unusual dangers in AT&T's opposition, which is based on the claim that orders to switch local service don't always flow seamlessly

through Bell Atlantic's electronic systems. Basically, AT&T wants some judge to rule that Bell Atlantic isn't perfect. Well, as more than one network manager has pointed out to me, it's not as if AT&T never misses an installation date. How'd AT&T like to have a court probe into its order-entry and billing systems?

Everyone agrees the telecom industry in the 21st century has to stop being about legal warfare and start being about competition and innovation. Perhaps AT&T should join the new era now that it's under way. And no letters about how the 21st century doesn't really begin until next year, thank you very much.

Robde is a senior editor with Network World. He can be reached at drobde@nww.com.

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BigIron 8000

Switch & Switching Router



Enterprise Applications

Intranets, Messaging/Groupware, E-commerce, Security, Network Management, Directories



Briefs

Inprise last week said it will launch the new version of its InterBase database management system as open source software. The company will release the source code for Version 6 of its SQL database for Linux, Windows NT and Solaris at an unspecified date early this year. The Scotts Valley, Calif., firm will continue to sell and support InterBase 5.6 through normal channels.

Inprise: www.inprise.com

Acta, a Palo Alto, vendor of add-ons for SAP's R/3 enterprise resource planning systems, last week shipped a \$75,000 software module called Customer Billing eCache. The module provides a way to share business data between e-commerce servers and back-end SAP systems.

Acta: www.acta.com

Axent Technologies has unveiled the PowerVPN, an IP Security (IPSec) virtual private network server that runs on Windows NT and can be used as a secure, remote server or as part of Axent's Raptor firewall. PowerVPN, which ships with free IPSec client software, supports the IETF's Internet Key Exchange protocol. The PowerVPN Server and the firewall-based PowerVPN, set to ship this quarter, cost \$2,000 separately or \$2,500 for both.

Axent: www.axent.com

CheckFree Holdings has announced it will acquire Blue-Gill Technologies, a maker of Internet billing applications, in a stock swap valued at approximately \$250 million. The deal will bring CheckFree new customers in South America and Europe, including Barclay's Bank and Cable & Wireless. CheckFree offers bill-payment processing and other services.

IN-SITE: Lessons from Leading Users

Secure extranet is just what the doctor ordered

BY ELLEN MESSMER

The National Board of Medical Examiners (NBME), whose job is to accredit physicians in the U.S., has set up an extranet to provide online access to doctors' test scores and other data.

Medical schools, state medical licensing authorities, hospitals and other organizations need to know how medical students have scored on the tough

exams given by the NBME, which also keeps track of whether or not physicians are in good standing.

The NBME decided it could disseminate such information much more quickly over the Web than it could via paper. The NBME's main challenge was finding a way to really be sure of the online user's identity and restrict access to the appropriate information,

all housed in an Oracle database.

"Once we decided to use the Web, we needed to have a good way to qualify users online to make sure they are who they say they are," says Steve Lopez, the NBME's director of IT. Simple passwords and IDs, used over and over again, were seen as inadequate because they can easily be com-

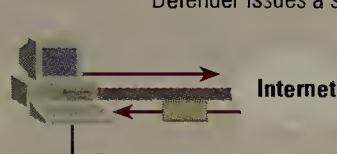
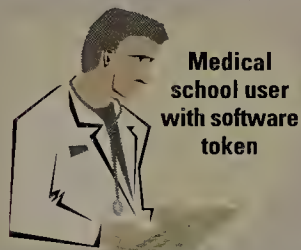
See **NBME**, page 34

Medical board cuts down the paper trail

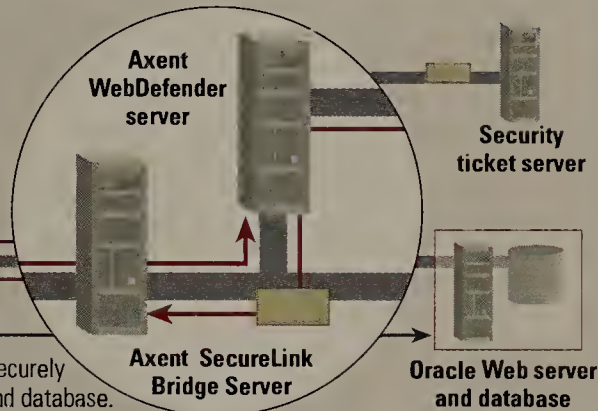
The National Board of Medical Examiners installed a Web-based extranet to give hospitals and medical colleges secure access to physician records.

1 A user logs on to the SecureLink Bridge Server at the NBME's site, using a one-time password generated by a WebDefender software token on his or her PC.

2 The bridge server sends the request to the WebDefender Server, which checks the user's identity and password against a list of authorized users. If OK, WebDefender issues a software "ticket."



3 With the ticket, the user is granted limited access to securely download physician records on an Oracle Web server and database.



Mail.com buys e-mail service firm Lansoft

BY CAROLYN DUFFY
MARSAN

NEW YORK — As part of an ongoing effort to bolster its position in the corporate e-mail outsourcing market, Mail.com of New York last week acquired Lansoft of Columbus, Ohio. The financial terms of the deal were not disclosed.

The Lansoft deal is Mail.com's fourth acquisition in less than six months — all designed to increase Mail.com's corporate customer base and service offerings. In August, Mail.com purchased The Allegro Group of Dayton, Ohio, which provides Internet e-mail management, screening

and hosting services to 1,000 companies. In October, Mail.com acquired TCOM of Morristown, N.J., which provides software development services to telecommunications carriers. And in December, Mail.com announced plans to acquire NetMoves of Edison, N.J., which provides Internet fax and document delivery services to 7,000-plus companies.

Messaging application service providers "are looking for ways to break out of the consumer model that they've been successful in and position themselves for the outsourced business market," says Mark Levitt, research director of collaborative computing at International Data Corp., in Framingham, Mass. "It's a big change going from an advertising-based wholesale hosted e-mail business for consumers to a business messaging model, where you're paid on an annual basis for resource-intensive services."

Levitt says competitors Critical Path

and USA.NET are ahead of Mail.com in terms of attracting corporate customers but that the market is still too small and too new to rank the players. Both Critical Path and USA.NET also recently acquired or licensed software technology required to support enterprises.

"There are a lot of players betting that [corporate outsourced messaging] is going to happen this year or next," Levitt

See **Mail.com**, page 34

Messaging

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'Net Insider . Scott Bradner

WHAT WILL IT LOOK LIKE?

The beginning of a new year, decade and century seems to get we pundits looking back to history while at the same time trying to predict the future, and I am not immune.

I started writing this column in January 1993. The network world was a very different place at that time. I doubt that many, if any, observers in those days could have predicted the Internet of today or the push toward the convergence of telecommunications technologies that seems to be on the near horizon.

In the early days of this column I spent time justifying an interest in the Internet in the face of the prevailing opinion that it was going to be replaced by something real. *Newsweek* and *Time* both said so in big cover stories on the national information infrastructure. The edi-

tors of these publications also admonished me for spending too much time on this toy called the Internet.

It's a bit different today, with *Time* giving its Person of the Year award to Amazon.com's Jeff Bezos for changing the basic nature of the retail business, and with the Internet figuring prominently in *Newsweek's* predictions for the next century. Few now doubt the impact of the Internet.

But it's still a mysterious and worrisome thing to many, including fellow columnist Thomas Nolle, who in the Dec. 20, 1999 issue of *Network World* doesn't quite seem to understand that the Internet is international.

I think that two things enabled the Internet to become what it has become: the end-to-end model and the lack of government regulations.

The end-to-end model in the Internet means that data flows between end systems without anything special happening in the middle. In particular, you and I can come up with a new application and try it out over the Internet without having to get anyone's permission.

And the lack of government regulations regarding what one can and can not do (in the name of increasing reliability, for example) permits these experiments to continue.

But the Internet is getting too important in too many people's minds. It's getting too important to be left to the technical people and entrepreneurs. So governments will step in to help make sure the Internet succeeds, and they may seriously reduce its chances of success in the process.

Arthur C. Clarke observed that any

significantly advanced science is indistinguishable from magic. Today's Internet would be close to magic when viewed from January 1993. I hope that the Internet of 2010 is as magical when viewed from the current era. I predict it will be, if governments don't help too much and compromise the end-to-end model with too many regulations. But I fear they will.

I should have a more positive attitude at the start of a new century, but I don't.

Disclaimer: Harvard does not have formal opinions on centuries, so the above is my own pessimism.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

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NBME,

continued from page 31

promised through sharing with others, he says.

The better answer for the extranet, Lopez says, was what security experts call "two-factor authentication" — which means generating a one-time password through a software or hardware token given to the user along with a unique PIN number.

Because the NBME was satisfied with the Raptor firewall from Axent Technologies it has been using for a long time, Lopez last year looked at adding two other Axent products — the SecureLink Bridge Server and WebDefender. These two products work inside the intranet to provide the remote user with single sign-on to Web pages.

The Unix-based SecureLink Bridge Server acts as a proxy to the firewall for the remote user — in this case, an individual at a medical school or other organization who wants to obtain



The NBME's Steve Lopez found a way to make Web transactions secure.

physicians' records. The outsider has to prove his identity over the Web by entering a one-time password created by the WebDefender software token issued by the NBME.

The bridge server passes this identity authentication request to the WebDefender server, and if the remote user's identity checks out, WebDefender issues a software ticket. The ticket grants restricted access to a Web application server.

"We have about 130 outside people from medical schools using this to get test-score information from the NBME," says Lopez, who notes the system has been in

place since the fall.

The NBME's IT staff made sure to keep the organization's business divisions fully informed about the extranet project to encourage future use of the technology.

The next extranet application under way at the NBME will give college professors a way to discuss testing online rather than in person. ■

Mail.com,

continued from page 31

adds. "We'll see it being a trickle that will grow in the coming year, but I don't expect huge numbers of companies fully outsourcing their e-mail."

Lansoft provides e-mail management, e-commerce and Web-hosting services to about 700 companies, including Wilson Sporting Goods, Oriol HealthCare, Echlin

and Landmark Education Corp. Under the terms of the acquisition, Lansoft's data center and 11 employees will move to Dayton and become part of Mail.com's Allegro Group subsidiary.

Mail.com manages more than seven million Web-based e-mail boxes and has a staff of 120. Mail.com provides e-mail services to consumers, ISPs, Web sites and, through Allegro, corporations.

Mail.com: <http://corp.mail.com>



Technology Update

An Inside Look at the Technologies
and Standards Shaping Your Network

Ask Dr. Intranet

By Steve
Blass

We have a small Windows NT intranet with Windows 95 workstations. We obtained digital subscriber line (DSL) service

with nine IP addresses (209.31.36.29 through .37, gateway is 209.31.36.1), configured TCP/IP on the workstations and everything worked fine. We then obtained a stock quotation system for three workstations. We installed the equipment and re-addressed the workstations (210.7.75.67 through .69, gateway address is 210.7.75.65). The stock service works fine, but it killed the DSL Internet access.

Our back-office system has two NT workstations connected to a Unix box using IP addresses 192.168.0.1 through .3 on the same Ethernet segment as the rest of the office. We want to let the back-office system use the DSL Internet service.

Are there built-in facilities within Win 95 that will let the stock-feed workstations also access the 'Net through our DSL service? How about the back-office workstations? Do we have to employ a hardware solution, such as a router?

Via the Internet

You could provide 'Net access to the back-office systems by giving them IP addresses in the 209.31.36.x range. You may be able to configure the stock-feed workstations to talk through both gateways by abusing the Win 95 route command, but your gateways may not cooperate. A router or a workstation with multiple network cards to route between your IP subnets would solve the address resolution problems.

Blass is a network architect at Sprint Paranet in Houston. You can reach him at drintranet@paranet.com.

HDSL2: Why 1 wire is better than 2

BY KEITH ATWELL

While the price of raw copper may be low, the cost of installing new copper facilities is higher than ever. That means carriers must do whatever they can to leverage their existing copper infrastructures.

The answer for most telephone companies is high-bit-rate digital subscriber line (HDSL) or the newer, two-wire HDSL2. A widely deployed symmetrical DSL service, HDSL provides full T-1 service, or a bidirectional rate of 1.5M bit/sec, over two copper pairs. In contrast, HDSL2 uses only one copper pair to provide the same level of service.

Small to midsize business can expect to see telcos using HDSL2 as a T-1 replacement that will provide more eco-

invest time and money to replace copper wires with fiber optic cables, making HDSL2 an excellent solution wherever a large investment in copper has already been made and service needs continue to grow.

The economic benefits of HDSL2 are enormous because providers potentially will be able to generate twice as much revenue from two copper pairs as they can with either HDSL or traditional T-1. Use of HDSL2 also allows the local carrier, which owns the copper wires, to alleviate "copper exhaust," or the shortage of copper facilities. Finally, local carriers

24 hours. That makes it the fastest and most cost-effective option for deploying T-1/E-1 lines.

Vendor interoperability will be another critical factor in the success of HDSL2. Because lack of vendor interoperability creates difficult deployments and limits providers to specific vendors, many providers are wary of venturing into new territory. Although HDSL is the most widely deployed DSL, it is not governed by a standard. The pending HDSL2 standard, as defined by the ANSI T1E1.4 committee, contains sufficient technical detail to let vendors deploy interoperable products.

Toward this end, the industry-led HDSL2 Consortium, composed of leading telecommunications product and chip vendors, will work together with the University of New Hampshire Interoperability Laboratory to test vendor products for interoperability. The combined efforts of the Consortium, the university lab and the committee are

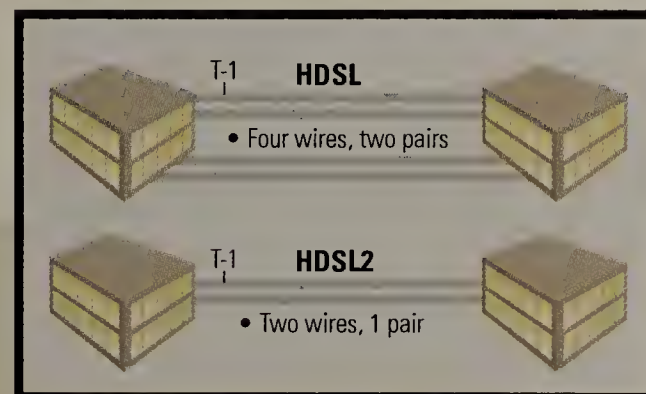
expected to avoid interoperability problems such as those associated with early ISDN deployments.

Among the most sophisticated DSL technologies, HDSL2 benefits service providers and subscribers alike. To summarize, this copper-saving technology:

- Minimizes self-induced noise using offset bandwidths in the upstream and downstream directions.
- Optimizes performance by reducing noise in the presence of other DSL technologies using "OPTIS" spectral shaping.
- Allows transport of full T-1 data rates using CSA deployment guidelines on a single copper pair.

Ensuring healthy competition through interoperability, HDSL2 benefits service providers as well as other market segments. Because HDSL2 chipsets and products will be available from multiple sources in the near future, competition will increase as service providers demand the best products for the best prices. This will result in economical deployments, and in lower costs to consumers for T-1 services delivered by HDSL2.

Atwell is a product line manager at Adtran, a maker of transmission products for high-speed digital communications. He can be reached at keithb.atwell@adtran.com.



UP CLOSE

Comparing HDSL and HDSL2

Midsize businesses can expect to find lower-priced services from carriers deploying HDSL2 because this newer version of high-bit-rate digital subscriber line lets providers reap additional revenue from existing copper infrastructures. Because it uses only two wires, HDSL2 consumes only half the copper resources of four-wire HDSL.

Characteristic	HDSL	HDSL2
Payload	T-1 at 1.54M bit/sec	T-1 at 1.54M bit/sec
Pairs	One	Two
Line code	2B1Q	TC PAM with spectral shaping
Line rate	2 at 784K bit/sec	1.552M bit/sec
Maximum loop length (depending on wire gauge)	9,000 – 12,000 feet	9,000 – 12,000 feet
Noise margin on CSA Loops 1-8	6 decibels	5 decibels

nomical deployments.

By changing the line code from 2B1Q to TC PAM with spectral shaping, HDSL2 not only provides full T-1 service using a single copper pair on loops that meet the Carrier Service Area deployment guidelines, but it also resists noise resulting from coexistence with other DSL services. And because it uses only two wires, HDSL2 consumes half the copper resources of its four-wire predecessor.

Like other flavors of DSL, HDSL2 lets carriers deploy high-speed data services using existing copper facilities. This means service providers don't need to

can increase revenue by using the existing copper pairs to deploy more services, or by leasing more copper pairs to alternative service providers.

Additional benefits are found in HDSL2's fast deployment and customer turnup, which follow the example set by HDSL. For most carriers, reducing the time technicians spend in the field is key to the success of a new technology. Likewise, quick turnup is essential for maintaining good customer relations and avoiding lost revenue. In fact, telcos can provision high-speed digital services over existing copper with HDSL2 within

Gearhead — inside the network machine . Mark Gibbs

AN INSIDE LOOK AT HOW NEW WEB APPS GET DATA FROM FORMS

In the last installment of Gearhead, we started to answer a reader's question: "How does a Web server application get data from a form?"

We got as far as discussing what goes on in an HTTP transaction, so this week we'll start to answer the question. (This is what irritates so many noncomputer-literate people — they ask you what they think is a simple question and when, two hours later, you've explained the first minute fragment, they get cranky. Rest assured, there's no way out of this social problem, and you'll just have to get used to the grief.)

So, we talked about the browser sending the Web server a GET request. Let's look at that GET request again.

GET/stuff/mydoc.html HTTP/1.0

User-Agent: xxxxxx

Accept: image/gif, image/jpeg, */*

The actual request (GET/stuff/mydoc.html) is in the HTTP header (in fact, there's nothing but a header in a GET request) and in this case, the objective is to retrieve a Web page. But when a form is involved, GET requests are more complex because they involve a back-end application. For example:

GET/cgi-bin/myapp.pl?search=



Gearhead%20columns&hits=10 HTTP/1.0

User-Agent: xxxxxx

Accept: image/gif, image/jpeg, */*

Here we're asking for the Perl application myapp.pl to be run, and we're also supplying the data to be sent to the program, that is the string "search=Gearhead%20columns".

Note the question mark — everything following it is called the query string and the query string is passed to the application (which is launched by the Web server) in an environment variable called QUERY_STRING. (Environment variables are memory-based text strings that most operating systems provide for interprocess communications.)

Note that the "%20" is the way non-

alphanumeric characters are encoded in URLs sent by Web browsers. The encoding is simply the ASCII hexadecimal value, and the encoding is done to allow special characters to be used to separate the parts of the URL. For example, space characters define the beginning and end of the URL that is the target of the GET request. Also, the ampersand separates arguments in the URL. Each argument has the structure: <key>=<value>.

If a form generated the request, each <key> is the name of a field (defined by that field's NAME attribute).

Note that a form doesn't have to be the generator of the request — the same request could be made by an application that constructs the HTTP header, opens a TCP socket to a Web server's port (80 by default) and sends the request directly — but that's probably best left for another column.

Anyway, to generate the HTTP request above we could use the form:

```
<form method="GET">
<p>Search term: <input type=
"text" name="search" size="20"> </p>
<p>Number of hits: <input type=
"text" name="hits" size="20"></p>
<p><input type="submit" value=
```

"Submit"></p>

```
<p><input type="reset" value=
"Reset"></p>
</form>
```

Now, in the QUERY_STRING environment variable is the whole query string in its raw, encoded form, i.e., "search=Gearhead%20columns&hits=10". This means that the program has to pick apart the various arguments and decode the encoded characters. Luckily, the tedious code to do this is available in libraries for most of the major languages, Perl included.

So, what's the downside of the GET method? The space put aside to hold the operating system's environment variables. Throw too many fields into your form or cram too much data in a field and your data gets truncated or something else goes wrong.

Is that all there is to it? Well, yes, at least as far as the GET method is concerned, but that's not all. There's also the POST method, which, needless to say, operates in quite a different manner and which we'll have the pleasure of disemboweling next week.

GET your arguments and opinions to gb@gibbs.com

NetworkWorld Fusion Spotlight

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Synchronizing time

In this week's Help Desk, a reader asks Editor Ron Nutter about synchronizing time on his network. He has an HP-UX 10.2 server that he'd like to hook by modem to the National Institute of Technology and Standards to set the time. But the rest of his network is Windows NT 4.0. Can he use TimeServ in NT to query the HP-UX server? And which would be better to sync up the net — a dial-up or a 'Nct connection? Find out

what Nutter suggests.

DocFinder: 6330

Whom do you trust?

Paul Hoffman, director of the Internet Mail Consortium, tells us in this week's "In the Works" column that S/MIME is avoided because of trust. "When you start using public key cryptography, you have to buy into a public key infrastructure. To do that, you must trust someone to create certificates that you can use to encrypt mail. Technically, this

is easy; in practice, it is very difficult because we don't know whom to trust," he says. What will it take to pull S/MIME out of the basement?

DocFinder: 6331

Bargaining chips

Sitting down to negotiate a salary increase or job offer can be daunting. That's why Career Doctor Shaun Kelly offers 11 tips for getting what you want at the bargaining table. "Employment negotiations are different from other types of negotiations," he says. "When the negotiations are over, you will have to work with your former 'adversary' on a daily basis; more importantly, your career success may depend on the person with whom you have just finished negotiating." Chime in with your own tips.

DocFinder: 6332

Y2K: Over and out?

Columnist Fred McClimans says we haven't seen the last

of the millennium bug. But as the panic attack dwindles and firms start peering at their empty IS wallets, who will suffer the wrath? Tell us what you think.

DocFinder: 6333

Power shifts

If you read last week's Power Issue, you got a good helping of who's on top and who's not. But as you well know, things can change based on which technologies grab the spotlight. Readers say one power shift could happen based on whether companies forge ahead with e-mail filtering or if they back off and trust their employees. What challenges do you see on the horizon?

DocFinder: 6334

Used gear

Auctions are taking hold in the networking industry and they are offering IS managers a chance to get gear cheap.

Have you bought second-hand gear online? And if so, how has it worked?

One reader says it helped him get up to speed quickly and inexpensively. "I purchased three used Cisco 2501 routers, which did wonders for my various certification exams. Most importantly, [they have] helped get me ready to face customer's networking problems by simulating the environment beforehand," he says. What do you think?

DocFinder: 6335

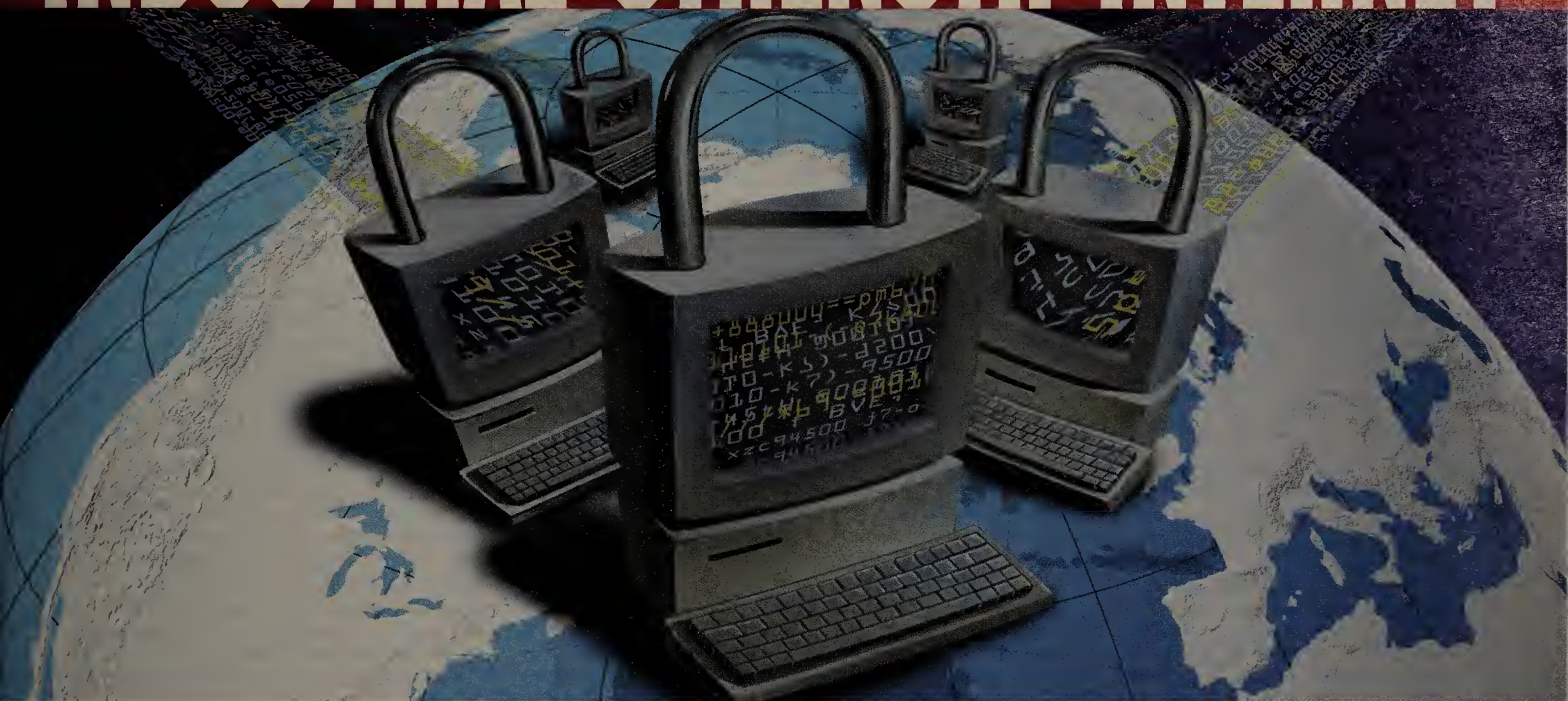
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Editorial

Hats off to the Y2K warriors

By now you are sick of reading about how Y2K was, in the words of the popular media, a non-event. Of course it was. But what John Q. Public doesn't realize is how much of your sweat and blood went into ensuring it was a non-event.

In fact, even as we gladly begin to put it all behind us, the world seems to feel kind of gypped. After all, there is nothing like a pending disaster to bring people together.

It's the basic storm mentality. People are downright congenial when they're socking away provisions for a coming blow. Chatter in supermarkets increases and neighbors sud-

denly have something to say to people they don't otherwise talk to.

Y2K was even better conversation material because it lasted for more than a year and it wasn't regional. You could talk Y2K to complete strangers almost regardless of location or vocation. Case in point: I was making a Christmas visit to the 98-year-old woman whose house I bought a few years ago, and when I went to leave she asked if I would mind fixing her flashlights "in preparation for Y2K."

But after the big buildup, all the public had to satisfy its hunger for disaster was a few wafer-thin glitches. For example, the Bureau of Alcohol, Tobacco and Firearms had to shut down its Firearms Licensing System when it couldn't read the date on applications.

John Koskinen, chairman of the President's Council on Year 2000 Conversion, last Monday reported that he had spoken to 36 state government Y2K coordinators, of which 18 had no glitches to report. The other 18 had only minor problems.

More interesting, Koskinen said one state had replaced three non-mission-critical systems "related to correspondence and message tracking," but left the old systems running. All three failed at the appointed hour.

Unfortunately, not enough of that kind of information will circulate to validate your hard work. The industry so thoroughly eradicated the bugs that the public was left thinking the whole thing was overblown.

So be it.

What is annoying, however, are the doom-sayers who won't let it go. They're already out there wagging their fingers and shouting that we haven't seen the last of Y2K yet. They're probably right, but only to some small degree. For the moment, let's revel in our success.

— John Dix
jdix@nww.com

Message Queue

BETTER RED THAN DEAD

Regarding the news brief "NT 4.0 passes security muster" (Dec. 13, 1999, page 6):

It is very misleading to portray NT as having the C2-level security rating without telling readers the whole story. NT 4.X has obtained orange book C2-level certification, which does not include having a network interface card installed. So the certification is for stand-alone systems only, which means it isn't much good for most users.

If a company wants its entire network certified, it will have to select a network operating system from the red book class, such as NetWare or a couple of Unix variations that meet these criteria.

David Maurice
NetWare and NT administrator
San Antonio, Texas

UNNECESSARY MIGRATION

With his column "The implosion of token ring" (Dec. 13, 1999, page 26), Kevin Tolly does the millions of token-ring users a grave disservice. Tolly is advising tens of thousands of companies — mostly small and midsize enterprises — to begin the "massive migration" and "forced march" to Ethernet.

This point of view is decidedly not in the best interests of these customers. Companies have substantial investments in their token-ring networks and are generally not willing to discard them, recable their facilities, install an all-new infrastructure, retrain their staffs and incur all the other costs associated with such a massive migration without a clear, compelling return on that investment. Tolly does not provide — nor has anyone provided — that clear, compelling return.

Switching and 100M bit/sec token ring represent an ideal way for customers to extend their investment in token ring into the Internet age. As a company's applications demand higher bandwidth to the desktop, 100M bit/sec network interface cards and switches represent a complete solution at a low, incremental cost. The superior quality of service of token-ring networks over Ethernet networks is well-documented, and token ring is ideal for deploying the

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DocFinder
find it 6329 online

emerging Internet-based applications, from hosted productivity applications to IP telephony.

Michael Jackman
General Manager — Americas
Madge.connect
San Jose

TAKE A SIP

It was good to finally see an article on Internet standards-based telephony, such as Session Initialization Protocol (SIP) ("New protocol connects voice over IP," Dec. 13, 1999, page 51). However, the author failed to mention the main reason why engineers from service providers and numerous vendors have submitted a flood of Internet drafts to the IETF: the potential for new services based on SIP's HTTP-like architecture and integration of voice with Web services.

Statements such as "[SIP is] not any better or worse [than H.323], just different" gloss over real reasons why service providers, hardly a negligible segment of the market, are implementing SIP. Maybe a follow-up article on SIP-based services would do better.

Henry Sinnreich
Richardson, Texas

AMERICA FIRST

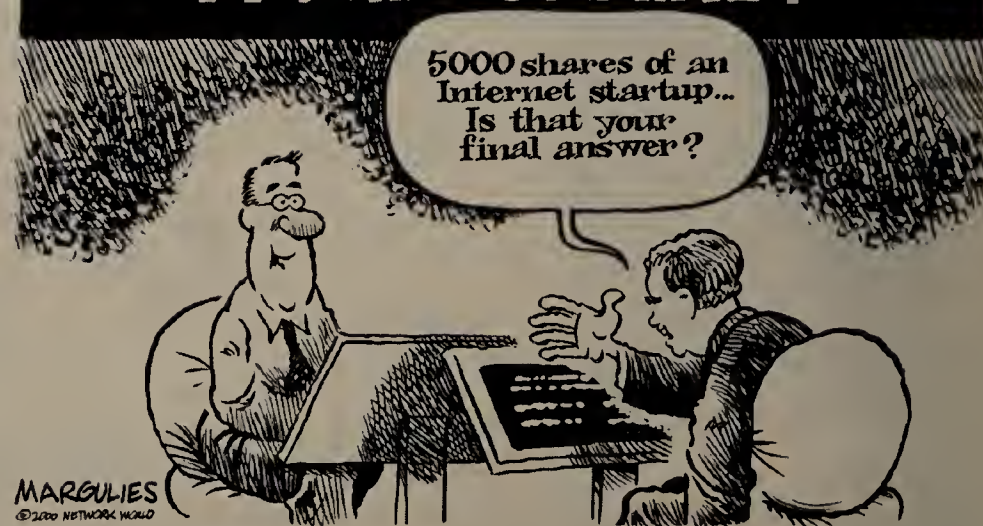
I find it ironic that your H1-B article was titled "Using your visa card" (Dec. 13, 1999, page 69). This "buy now, pay later" mentality is an unfortunate mindset among many high-tech companies in America today. Rather than investing in re-education and training of American citizens, these companies take the easy way out by importing foreign nationals. Also, I have read disturbing reports of age discrimination in the high-tech industry, which only fuel to the fire.

The AEA, IEEE-USA, AFL-CIO and others have rightly opposed using mass immigration to solve the imagined high-tech worker shortage, and fortunately, legislation to double the current cap (65,000) on H1-B visas has been defeated in Congress.

I would encourage everyone to visit the Web site of The Federation for Immigration Reform (www.fairus.org) to learn more about this important subject.

Andre Caesar
Portland, Ore.

WHO WANTS TO BE A MILLIONAIRE?



RELIABILITY: SOMETHING YOU BUILD, NOT BUY

Some people might think it's been a bad couple of months for reliability. MCI WorldCom lost a big chunk of its frame relay network for more than a week. AT&T's Internet service was inaccessible for almost a full day. Critical Path's e-mail service has kept some ISP customers away from their e-mail for hours at a time. Sheraton's Web site got hacked and was not taking e-reservations for more than an e-day — that's seven days in normal time.

However, believe it or not, there is a bright side to these outages. They help company decision makers understand a basic and underlying design principle of the Internet: Reliability is not part of the basic package.

Before the Internet, most telecommunications networks were designed and built to be as bulletproof as possible. That's a great design principle, but it has a drawback: Ultra-reliable systems are expensive systems. High-reliability networks also tend to be slow — you get superhigh reliability by having elaborate procedures for change and configuration control,

administrative checks and balances, and big operations staffs to watch over it all.

The Internet's infrastructure doesn't have that kind of control. It's fast moving, and it's a 99% solution, meaning 99% of the time, it works incredibly well. And, as we've all discovered, it's dirt cheap. The last X.25 line I ever bought cost \$1,400 per month and a nickel for every packet, at 9.6K bit/sec. Now, I can get a digital subscriber line for \$60, run at 256K bit/sec and no one is counting packets. Amazingly cheap.

But these incredibly low costs come with trade-offs, including reduced reliability. The problem is that some businesses see the lower costs but don't understand that they're giving up something when they save that kind of money. They think that if they're giving AT&T \$19.95 per month for Internet access that they have a reasonable expectation it will work, all the time, flawlessly. Oh, and no busy signals, either.

That's why I like to see a couple of high-profile outages now and then. It reminds people that the Internet is not 100% reliable. As more and more busi-

nesses come to depend on the Internet for business-critical communications, they need an occasional reminder of what they're paying for — and what they're really getting.

The solution is not to throw money at the problem. Buying Internet service from AT&T, as we have learned, is not necessarily getting you anything better than you could get from Joe's Bar & Internet. In fact, the MCI WorldCom and AT&T outages have shown very clearly that big-name companies have no edge when it comes to keeping their networks running.

In the Internet era, reliability is becoming something you have to build, not something you buy. That's hard work, and it requires intelligence, skills and budget. You have your choice. Are you a 99% company, or are you a 100% company?

Snyder, a Network World Test Alliance partner, is a senior partner at Opus One, a consultancy in Tucson, Ariz. He can be reached at Joel.Snyder@opus1.com.

IN E-COMM, CUSTOMER SERVICE SHOULD BE FUNDAMENTAL

International Data Corp. has dubbed 1999 the watershed year between "the age of e-commerce pioneers" and "the age of diffusion and competition."

Most large companies with a product or service to sell have already deployed a business-to-consumer Web site.

But merely having a sales presence on the Web is no longer a differentiator. A good e-tailer needs

other attributes to differentiate itself from its competition, such as product, price, a gimmick, or just good, old-fashioned customer service.

As we get more comfortable with online shopping, however, our willingness to overlook technical glitches

or other bad experiences diminishes.

We get to the point where one negative experience will make us avoid that company's Web site for good. In fact, one such instance left me with such a bad impression that not only am I hesitant to visit the company's Web site again, I'm inclined to walk past the brick-and-mortar storefront as well.

On Nov. 11, I placed an order with a well-known toy e-tailer. Just placing my order was a real feat. I tried for several hours to get into the Web site, only to be told that its servers were overwhelmed due to demand.

When I finally got to the site, I selected two items I wanted and noted that both were in stock. I put them in my shopping cart, went through the

cumbersome checkout process and received an electronic notification that my order was received and being processed. I expected delivery of my purchases within a week to 10 days, as I did not request special delivery.

Two weeks went by, and I received nothing and heard nothing from the e-tailer. I went back online to check my order status and saw that it was still "in process." Another week passed and no progress was made.

Finally, on Dec. 5, I received an e-mail saying my order would be shipped within five to seven business days. "Sorry for the delay," the e-mail said, "but we've had big demand for our products this season. Here's an e-coupon good for \$10 off your next online purchase."

Meanwhile, I anticipated that I would soon receive the two items I had ordered. Imagine my surprise when, three days later, a box arrived with just one item in it. A note inside said the other item was out of stock, so they cancelled my order for it, without even asking me if that was OK.

This kind of behavior might have been acceptable during the pioneering age of e-commerce, but it is definitely not acceptable in the age of online competition.

What bothers me most is that I was not kept informed of the progress or problems in fulfilling my order, which would have been so easy to do via e-mail.

This brings me to my Fundamentals of Customer Service for Online Shopping — or, more broadly, e-commerce in general:

- Keep the customer informed and involved. I would have been less angry if this toy company had

kept me informed of the progress of my order. When it was discovered that an item was out of stock, why wasn't I informed, and why didn't the company offer to send it later? I probably would have accepted a backorder slip. Instead the company simply cancelled my order and lost a sale — and, quite likely, a customer.

- Don't make promises you can't keep. Telling me that an item was in stock when I placed the order was an implied promise. Making a promise you can't keep leads to disappointed customers.

- Anticipate demand, and then multiply that by 10. This company was clearly unprepared for the demand its nationwide advertising campaign generated. There are two issues here. On the technical side, the servers and software couldn't handle the access demands. On the logistical side, the company's order fulfillment system couldn't process orders fast enough. If this company wants to play in the big leagues, both issues must be addressed quickly.

- Follow up to make sure the customer is truly satisfied. Despite the \$10 e-coupon, I'm not going to visit that shopping site anytime soon. This experience reminded me that toy e-tailers are a dime a dozen on the Internet, and I'll keep looking until I find one with superior customer service.

Companies that want e-commerce success need to remember that online shoppers have endless choices. The winner will be the e-tailer that puts customer service first.

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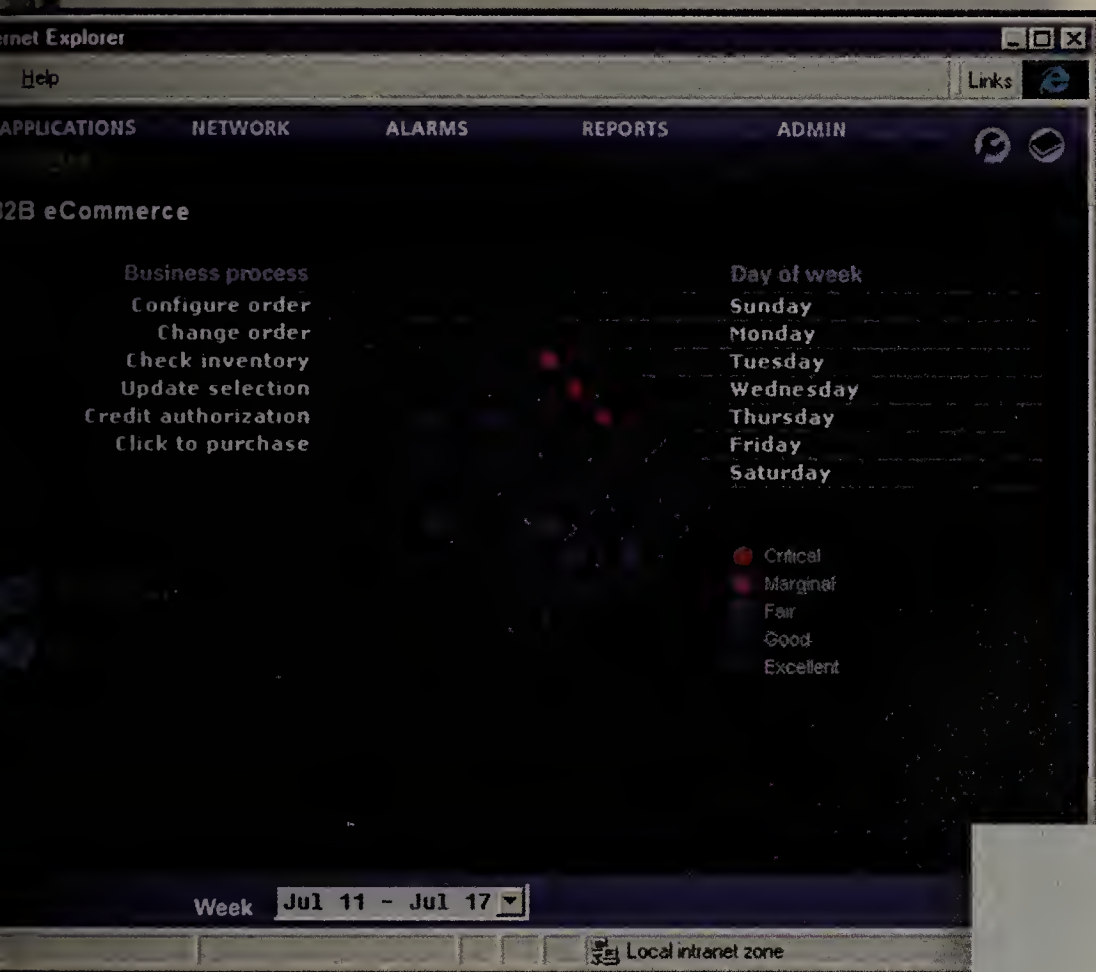


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DIARY OF A HACK ATTACK

BY DEBORAH RADCLIFF

We go behind the scenes as a hacker for hire tests an e-business's security perimeter.

On a crisp, sunny November day in the nation's capital, in the sparsely furnished second-floor office of Para-Protect, "Bob the hacker" hunches over his monitor and fires off Unix command lines in short, machine gun blasts.

Bob is testing the perimeter defenses of a certified Internet mail delivery company, which is paying for the privilege.

The start-up e-business doesn't have the budget to pay for a full-blown assault on its network, which would involve Bob actually taking down the company's servers. And besides, it can't afford to have its e-business servers down for any length of time. But it has hired Para-Protect, an information security consulting company in Alexandria, Va., to conduct a scouting expedition.

And they've agreed to allow me to tag along on the mission, code-named Alabama, as long as I keep Bob's identity and the name of the e-business secret.

These paid-for front-line assaults are a good starting point for network protection because the tests (often referred to as "red teaming" or "penetration tests") can offer a baseline for information security policies and practices, industry professionals say.

With networked systems under attack from every direction — the Internet, modems and even disgruntled employees — the need for such services is on the rise. By 2003, the security consulting services market will likely reach \$14.83 billion, according to market research firm International Data Corp.

Venture-funded e-business start-ups such as Para-Protect's client are especially vulnerable to attack. Because of the intense pressure to get to market quickly, these start-ups are often building their infrastructures too fast to give security the thought it deserves, information security practitioners say.

"We have worked with companies that don't have a firewall. Most often, they are small start-ups that just got their venture money and have hired 50 people.

Then they get hacked, and they realize they're suddenly more of a target than they used to be," says Ian Poynter, founding president of security consulting firm Jerboa in Cambridge, Mass.

In our case, the e-business start-up's only line of defense is a Cisco 8000 router. If the router can deflect our probes, the company can use the supporting documentation from our report to show its customers that its public-key infrastructure (PKI)-based application is secure.

But the folks at Para-Protect are skeptical. "We disagree that the company doesn't need a firewall. You don't protect your perimeter using just a router even

if they are smarter [than they used to be]. Firewalls offer more filtering methods, and you need multitier security levels," says Robert Perholtz, enterprise account manager at Para-Protect.

The battle lines drawn, the attack begins.

08:00

The bargain-basement desks and folding tables are a dead giveaway that Para-Protect's second-floor lab has been tossed together in a hurry. A fidgety Bob is already on his second Pepsi of the day. With his dark brown hair slung back in a long, messy ponytail and his beard growing to his waist, Bob fits the physical profile of the stereotypical subversive hacker.

But don't let his looks fool you. Bob is a former U.S. Army sergeant and computer analyst for the Army, the Pentagon, and the Defense-Wide Information Systems Agency, which supports all of the U.S. Department of Defense. His last assignment was with the Defense Department's Computer Emergency Response Team (CERT). To hear Perholtz tell it, hacker Bob got out of the Defense Department and hasn't cut his hair or beard since.

Bob tells me that the first order of business is to learn more about our target. We start by paying a visit to the victim's Web page, replete with information about its ethics, partners and history.

"During discovery, we're looking for partner affiliates to find corporate links to the network," Perholtz says. "Often, fringe organizations aren't as secure as the main network."

We find nothing that stands out. So we go to the InterNIC and ARIN registrars (services that assign and record domain information) and key in a "whois" command. It spits out the domain name of our client and verifies the IP addresses we're about to attack.

Not only do these services give us the IP addresses of the target's three servers, they also give away other strategic information, such as company nicknames, and even the names and phone numbers of those administering the machines.



With the information provided by these services, we can get an overall picture of our target's network configuration, Bob says. At this point, we're only looking to verify the domain information of our intended target. It would be a real bummer if we hit the wrong victim.

09:36

The next step is to run traceroute against our three target IP addresses. Traceroute is a utility within Unix and Windows NT used by administrators to trace packets traveling between a source and destination. In our case, traceroute shows us that the router is blocking our packets, so we deduce that the router is doing its job.

But we were able to trace outgoing traffic to a specific port number, which our victim uses to connect to its ISP, UUNET. Bob makes note of this in his log.

It's time to grab some hacker tools. Although Para-Protect keeps a database full of its favorite tools, Perholtz runs a Web search on "hacker tools" to show just how available these are to anyone. Our search turns up 2,070 hits, including tools such as the Shadow Advantis Administrator tool set, which sends timed pings to a specified range of ports. The pings are slow enough and small enough to fall beneath the radar of intrusion-detection software.

Hacker Bob prefers network mapping (nmap), which does much the same thing. Nmap, also available from the Web, is an IP network discovery tool developed by a hacker named Fyodor. But really, it's a port scanner on steroids. In addition to finding open ports, it can change the characteristics of outgoing packets to get past the router's IP filtering list.

Throughout the day, Bob will run several types of nmap scans: (For more technical detail, visit www.insecure.org/nmap.)

- SYN, used to establish a TCP session. When the target responds back, we know the host is active. When it doesn't respond to ping, we know the host is blocked.

- FIN, which uses a bare packet as the probe to determine if a port is open or closed. From this we could guess what well-known services may be running based on what the open ports are generally used for. Even if the port is closed, it's required to respond with a reset packet (RST). If a RST bounces back, the port is closed. If nothing is returned, it means the port is open.

- Fragmentation scanning. When a packet reaches a host, the target has to reassemble the packet in order to make sense of it. Fragmented packets confuse these machines and can potentially bypass access controls.

Our first nmap scan in SYN is terminated because Bob misconfigures the command line, which he discovers later in the day. Bob gets another Pepsi from the fridge down the hall.

Then he pays a visit to UUNET and uses the subcommand "nslookup" to ask UUNET's Domain Name System (DNS) to tell us which machines it knows from our target network. UUNET gives us three domain names that come from our victim: "mail," "www" and another name Bob doesn't want mentioned because it would give away our target.

There are probably a number of other machines connected to the network, but Bob says they're outside the scope of our investigation. However, the DNS server does point out which of our IP addresses is our target Web server. We already know which machine is the router. So we make an educated guess that our

Hack attack game plan

Most security experts use the same four-step methodology when conducting an attack and penetration test:

Phase One

- Scope the target (find subsidiaries, IP addresses, types of machines).

Phase Two

- Scan the target for vulnerabilities (ping ports and look for services running off those ports).

Phase Three

- Exploit vulnerabilities (break in through vulnerable services, copy password files, crack them, etc.).

Phase Four

- Attack the target to disrupt service and bring down vital boxes.

The e-business in this story chose to limit the attack to Phases One and Two because of the cost and the fact that it didn't want its network taken down.

third IP address is our target's PKI/proxy server.

We've now diagrammed the network. A router sits as sentry to a Web server, a proxy server and another server, likely the mail server. It's time to find out what services are running on those servers. Attackers often look for services with known vulnerabilities and exploit those first.

Veiling his identity through a local ISP, Bob telnets to Port 80. We knew Port 80 would be open 99% of the time because network administrators leave Port 80 open for Web traffic. Telnetting into Port 80 shows us what is running on the HTTP server: Microsoft's Internet Information Server 4.0, which is a dead giveaway that the operating system is NT.

Then the phone rings. The client is getting access control list warning messages on its router from Bob's and his ISP's IP addresses. The administrators just want to make sure it's us and not some other hacker. Bob assures them it is.

Now that the victim knows we're rattling its doors, Bob forgoes the low and slow port scanning method, which would have taken days. Instead he launches a second nmap FIN scan against the entire range of ports (1 through 65534).

"This makes a lot of noise," Bob says as he swigs his Pepsi. "But normally it would take days to do this beneath the radar of intrusion detection. We have a two-day time constraint, so we have to do everything now."

The scan turns up nothing special. Only the ordinary services, such as FTP and HTTP, are running, meaning we're looking at a plain vanilla box. However, if configured wrong, FTP (or any standard service) could be exploited by hackers.

12:30

It's time for a break, so we head next door to the Vietnamese grill for a bite to eat. Bob's telling me how his next step would be to find vulnerabilities in the network, the operating systems and the applications running on the servers. But that's outside the scope of this job.

Once discovery is completed, you'd be surprised just how easy it is to break into an NT or Unix machine.

At an extreme hacking course at Ernst and Young in Houston that I attended over the summer, the class

broke into NT and Unix machines with reckless abandon. For example, we started in on an NT machine by establishing a null session. Null is a Microsoft utility that allows services to communicate with one another without user passwords or identification. By logging on as null, we were able to see everything we wanted: password files, user accounts and network services that we could exploit. And none of this was logged.

In null, we couldn't touch anything, but that didn't stop us from copying down user names. Then we logged back on under the user name "backup" and a guessed password "backup." At this point, we grabbed the password hashes (encoded passwords) and submitted them to l0phtcrack and John the Ripper, both of which are password-cracking tools freely available on the Web.

It only took 15 minutes to crack 70% of the passwords, log on as a super user and gain root access. Then, for the final slap in the face, we hid our bag of hacker tools behind a readme.txt file on the victim's server to use again.

NT passwords are the easiest to crack, according to my Ernst and Young instructor, Eric Shultz. That's because Microsoft's LAN Manager splits passwords into seven-character halves and uses a known constant to encrypt each half. Cracking tools are programmed for this and can thus decrypt the passwords very quickly. And the only way administrators can catch our bag of hacker tools hidden on the network is to set the log files to alert them when disk space changes significantly.

Although we used different command lines and Unix-based tools, gaining root on Unix during the class was also pretty easy. In fact, we leapfrogged through four networked Unix machines in a game of capture the flag. We also had a little fun corrupting the DNS server to reroute traffic to a phony IP address. Then we installed Trojan horses such as Back Orifice so the machine would do our bidding and punched open back doors so we could telnet back in without the need for IDs or passwords.

The Para-Protect folks do a fair amount of these kinds of full-blown attacks on a network, as well. And judging from his body language, Bob the hacker would really like to conduct further investigation into the vulnerabilities of his target. But he's fighting some internal networking problems of his own well into the day.

Day 2

In fact, the next morning we run fragmentation scanning against the target host. Bob finds a number of open ports vulnerable to packet fragment attacks. It would also be possible to modify an attack tool to get past the router, Bob says.

Thus, Bob's report recommends the client buy a firewall. The client would also be wise to do further testing on its entire network infrastructure. Of course, any more work depends partially on the client's ability to justify the expense.

But the client shouldn't count on Para-Protect's report to scare funding out of executive management. Rather, it should sell information security to management in a way that shows the added security brings value to the business, says Gregory White, chief technology officer of San Antonio, Texas-based Secure Logix, while speaking at a November Computer Security Institute conference in Washington, DC.

"If you're going to try and justify expenses based on risk analysis alone, you're going to have an uphill battle," White explained. "You need to sell security as a business enabler."

Radcliff is a freelance writer in northern California. She can be reached at derad@aol.com.



TCP/IP ESSENTIALS

BY LAURA CHAPPELL

No network professional should be without these 10 TCP/IP troubleshooting tools and utilities.

While there are plenty of specialized network management applications to help identify and fix problems, less than a dozen of them are absolutely essential for troubleshooting. These are the tools you'll use the most, so make sure your toolkit is equipped with these 10 basic necessities for effective, efficient network management.

1. Ping. Ping tests end-to-end connectivity by sending an Internet Control Message Protocol packet to see if a node or device is online and responding. One of the first steps in troubleshooting a network is to use the generic IP loopback address 'ping 127.0.0.1' to test the local device.

You can also use ping to test the maximum transmission unit — the maximum amount of data that can be carried in each packet end-to-end. Moreover, you might use ping to determine the round-trip time in milliseconds to another device on the network.

However, any tools that generate a lot of traffic through your ISP's routers will probably trigger an alarm. If your traffic increases CPU usage or saturates a link to the Internet, your ISP may investigate and limit your activities.

2. Traceroute. Traceroute builds on the functionality of ping by evaluating the hops along a path and calculating the time it takes a packet to travel from one router to the next.

For example, say you ping a remote device but it takes a long time to receive a response. To learn where the delay is occurring, use traceroute to examine the round-trip time to each of the routers along the path.

3. Protocol analyzer/network analyzer. A protocol analyzer (sometimes called a network analyzer) is an absolute necessity for understanding what your network is doing. Analyzers capture all packets, or specific packets defined in a filter, into a trace buffer. The analyzer decodes the packets to give you a readable definition of the contents. Some more advanced analyzers, such as Network Associates' Sniffer Pro, can also inter-

pret the communications patterns to provide alarms and troubleshooting recommendations.

AG Group's EtherPeek is another popular analyzer, and Windows NT comes with a no-frills analyzer called Network Monitor. EtherPeek and Network Associates' Sniffer Basic cost less than \$1,500, whereas Sniffer Pro and other more advanced analyzers cost closer to \$10,000.

4. Port scanner. Port scanning can tell you what services are available on a remote device. The screen shot (see graphic) shows the results of a port scan to 10.23.4.99 using Northwest Performance Software's NetScanTools Pro 2000.

Just as using ping could get you into trouble, your ISP or the targeted system may construe port scanning or port probing as a hostile action or intrusion. Moreover, port scanning may violate your ISP usage agreement.

5. Nslookup/DIG. Basic nslookup utilities make queries to Domain Name System (DNS) servers. An nslookup query will ask the default DNS server for host name-to-IP address resolutions. Domain Internet Grouper (DIG) is similar to nslookup, but provides a more detailed reply from the DNS server. For example, a simple nslookup reply for www.internal.net analysis.org returns the following information:

Translated name: server.netanalysis.com
IP address: 10.23.4.99

Alias: www.internal.netanalysis.org

DIG returns the information above plus the following:

Name servers: AUTH00.NS.INT.NET

IP address: 10.23.66.1

AUTH01.NS.INT.NET

IP address: 10.23.77.1

6. ARP. Address Resolution Protocol keeps track of IP addresses and their corresponding physical network

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MUST-HAVES

Fusion exclusive: Get the syntax for ping, traceroute, ARP and route.

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addresses. You can read ARP tables to identify the hardware address that is being used to send packets.

7. Route. Route is a utility that lets you read and manipulate IP routing tables on a local device. The tables determine the next hop along a path to a host or network. These tables also contain the default gateway entry if one exists.

8. SNMP tools. SNMP management tools provide a way to gather and display Management Information Base (MIB) data extracted from devices that support SNMP agents. You can track SNMP devices via an alarming/alerting system that notifies the SNMP manager when a user-defined threshold has been exceeded. However, one of the main obstacles to implementing an SNMP management system is the lack of a true cross-platform product.

9. Cable tester. You need a cable tester to precisely test and troubleshoot network wiring. Tools such as Microtest' OmniScanner often come configured with an entire set of tests to evaluate cable integrity and interference. Cable testers can report total cable lengths, pass/marginal/fail test results, near-end crosstalk, attenuation, impedance and more.

Some cable-tester manufacturers define their tools as network analyzers. Although these devices may provide some information about the packet types crossing the wire, such as broadcasts, they are no substitute for true network analyzers that display packet contents.

10. Combination tools and miscellaneous utilities. There are several indispensable combination troubleshooting tools, including NetScanTools Pro 2000 and the AG Group's NetTools. Each provides a group of utilities that let you port scan, ping, trace route and perform nslookup, saving hours of troubleshooting time. Of the two, NetTools is less expensive and offers a subset of the tools included in NetScanTools Pro 2000.

You may also want to consider other utilities that provide basic configuration and connection information, such as Windows WINIPCFG, IPCONFIG and netstat. An IP address calculator is another handy tool to have around, and you may even be able to find a free-version on the Internet.

Having the right tools makes the job of troubleshooting TCP/IP networks less painful and less mysterious.

Chappell is a senior protocol analyst with Network Analysis Institute, a network analysis, research and training firm in Saratoga, Calif. She can be reached at lchappell@netanalysis.org.

NetScanTools Pro 2000 in action

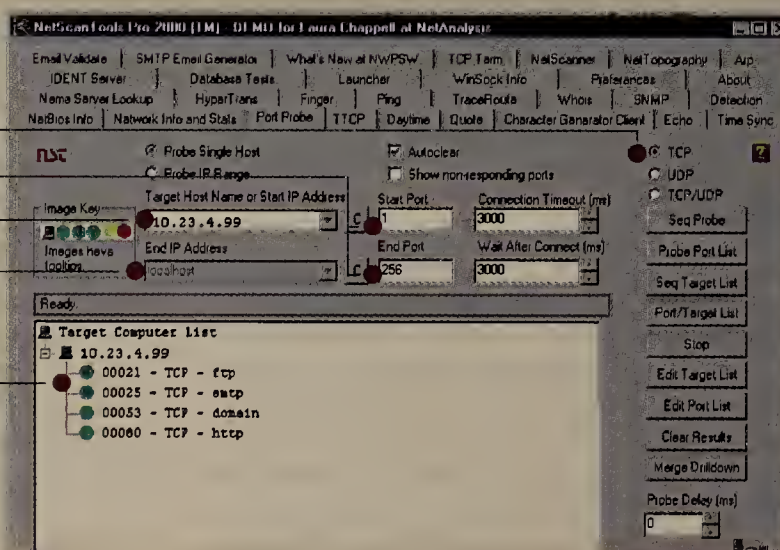
Probe for specific transport types in use.

Probe a single port or a range of ports.

Use an IP address or host name for the target.

Probe a range of IP addresses.

A port scan shows that the host 10.23.4.99 supports four active ports — 21-ftp, 25-smtp, 53-domain and 80-http.



What has two names, four slots, switches or routes at 32G bit/sec, and leaves most of the

other Gigabit Ethernet switches we've tested in the dust?

Hewlett-Packard calls it the ProCurve Routing Switch 9304M, and that's the version we evaluated. But Foundry Networks, which actually makes the HP hardware, calls it the BigIron 4000. Either way, with each of its four chassis slots filled with eight-port gigabit modules, the switch delivered maximum traffic loads on each port and didn't miss a beat (or a bit).

We first tested Layer 2 media access control (MAC) switching with static streams. That's where all of port 1's traffic is switched to port 32, all of port 2's input is switched to port 31, and so on. Then we tested Layer 2 switching using the "mesh test" feature of Ixia Communications' IXIA 1600 traffic generator/ analyzer. This is a grueling workout, in which packets arriving at a gigabit per second on each port (that's 1.488 million minimum-sized packets per second) are sequentially switched to each of the other ports in round-robin fashion. Picture a big round table, at which each of 32 dealers is dealing cards to the others at a rate of 1.488 million cards per second.

Under all Layer 2 configurations we found 100% wire-speed performance.

Next we tried Layer 3 IP routing, after setting up IP subnets on each of the 32 ports. We got the same results: 100% wire-speed performance, even for round-robin, mesh test routing among all ports.

In virtually every other performance metric, the switch checks out just fine. Head-of-line blocking? There wasn't any. Latency? It ranged from a mere 7 microseconds for 64-byte packets under a light switch

Packet-pushing powerhouse

HP calls it ProCurve 9304M; Foundry calls it BigIron 4000. Just don't call it slow — this Gigabit Ethernet switch doesn't miss a bit.

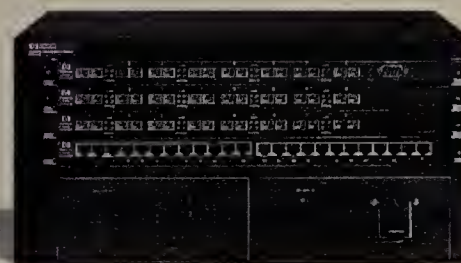
BY EDWIN MIER, ROBERT SMITHERS AND
MICHAEL MAKSYMOW

load to 70 microseconds with a full load on all ports. Jitter? The worst we saw was 17 microseconds with a full load on all ports. Those numbers indicate there's nothing to worry about with latency or jitter. And our tests showed there's no leakage between virtual LANs (VLAN).

The only unusual behavior we noted related to the switch's quality-of-service (QoS) features. The switch lets you assign as many as eight priorities to different traffic classes, based on criteria including MAC address, protocol, IP source or destination address, TCP or User Datagram Protocol (UDP) port numbers, or ranges of port numbers. It turns out, though, that these are mapped to only four queues, so you might say that the switch really supports only four discrete classes of traffic.

We assigned a top QoS priority to all UDP traffic, as a user might do to make sure that voice-over-IP traffic was always expedited through the network ahead of other, non-time-sensitive data. The HP switch dutifully gave priority to UDP traffic, but only up to a maximum of 80% of available bandwidth. We checked with the vendor, who told us there's a weighted-fair-queuing algorithm built into the switch's logic, which always reserves some bandwidth — 20% as it turns out — for other traffic sources and types.

We really can't argue with that. If you've got more than 80% of your bandwidth consumed by your top priority traffic, you might want to



ProCurve 9304M offers 32 Gigabit Ethernet ports in a compact package.

think of rearranging your priorities.

The switch's management functions are vested mainly in HP's browser-based Java interface, a feature not included with Foundry's version of the switch. The application is straightforward and fairly intuitive, but lacks any online help. Without that, you have to regularly stop and fumble through the documentation. The written documentation was clear and legible, with a full table of contents but an anemic index.

The application displays traffic statistics as raw numbers — a graphical display would be better. And while the statistics are updated automatically, someone forgot to put the units of measure on the display. You don't know whether you're looking at bits, bytes or packets. And because there is no on-screen help, you can only guess.

You can limit broadcast and multicast traffic switchwide, but we feel that per-port broadcast control would be better. Generally speaking, though, traffic flow controls, including per-port filtering, are adequate.

The command-line interface has a

NetResults

ProCurve Routing Switch 9304M

Hewlett-Packard

(800) 752-0900

www.hp.com/rnd/products/switches/switches_pc9304m.htm

\$112,995

Pros

- ▲ Wire-speed Layer 2 and 3 performance with 32 Gigabit Ethernet ports.
- ▲ Reliable, stable performer.
- ▲ Compact form factor.

Cons

- ▼ Java browser interface has no on-screen help.
- ▼ No high-speed WAN interfaces.
- ▼ Redundant management modules need work.

Cisco feel in its command structure and syntax, and overall is fairly useful. But the switch's management isn't helped much by HP's TopTools — a set of general-purpose management applications, which HP ships free with the switch. While graphical, the Windows-based TopTools suite is not that intuitive to use. It features a discovery capability, which adroitly turned up a couple of test tools we didn't think were speaking on our lab network. But other than that, TopTools didn't seem particularly useful.

As it did for performance and management, the switch fared well in the category of scalability and fault tolerance. All of the same modules in this model also work in HP's eight-slot model of the switch, the ProCurve 9308M, allowing for a graceful upgrade path.

Redundant power supplies and fans are available, and all modules are hot-swappable. We found a small problem with the redundant management modules, however. We tried out a new version of the vendor's redundant management cards, but we couldn't get automatic fail-over to work. HP acknowledged that the redundant management, still in late beta when we tested it, wasn't working properly and told us the company was addressing this. New, higher-priced redundant management modules are required to implement this feature.

Under the broad heading of functionality we rated this switch fairly high; as a Layer 2 switch or Layer 3 IP router there isn't much missing. Among the features are VLANs, QoS, and full IP routing — including Border Gateway Protocol 4, Routing Information Protocol

ScoreCard

ProCurve Routing Switch 9304M

Performance (25%) 10

Management and administration (25%) 7

Scalability and fault tolerance (20%) 8

Functionality (20%) 9

Installation (5%) 7

Documentation (5%) 8

Total score 8.4

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

versions 1 and 2, and Open Shortest Path First, as well as the set of new IP multicasting protocols.

Multilink trunking is supported. As many as four gigabit links can be aggregated in a logical trunk group

between two switches or between, say, a switch and a server with multiple network interface cards. You can assign traffic over a multilink group in a couple of ways to achieve some degree of load balancing. This setup

also provides link failover protection. We tested it and it works; traffic from a failed link is shifted over to a working link in about 0.3 seconds — actually a little faster than some competitors' gigabit switches.

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GAGA FOR GIGABIT

White paper: Get a detailed look at the switch.

Reviewer's guide: Walk through the product's features.



We tested with the vendor's 1000BaseSx port modules, but the switch also supports longer-distance 1000BaseLx, plus a full range of Ethernet and Fast Ethernet modules with as many as 24 ports per module. It lacks WAN interfaces such as OC-3, OC-12 or DS-3. And gigabit-over-copper — four-pair unshielded twisted pair, per the newly adopted IEEE standard — won't be available until next year.

The bottom line? HP's ProCurve 9304M is a performance dynamo, and its broad functionality and good scalability features make it a recommended buy.

Mier (ed@mier.com) is founder and president of Mier Communications (www.mier.com), a network consultancy and product test center based in Princeton Junction, N.J. Smithers (rsmithers@mier.com) is vice president, technology and Maksymow (max@mier.com) is manager of lab testing.

How we did it

We used an IXIA 1600 traffic generator/analyzer system equipped with 32 gigabit ports to test Layer 2 switching, Layer 3 IP routing, head-of-line blocking and latency using standard test scripts included with the system. We clocked multilink trunk switch-over by sending 1,000 packets/sec for 10 seconds across one of the trunk group's links, pulled that connection and then totaled the packets received; each packet of our total less than 10,000 represents 1 millisecond of switch-over delay. We checked virtual LAN leakage by setting up two VLANs and delivering loads of unicast, multicast and broadcast packet streams on one, while monitoring the other for any spillover traffic.

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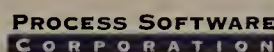


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Cool Tools Quick takes on high-tech toys

Lee Schlesinger, Technology Editor

HOME AUTOMATION X-10SIONS

And now the nominees for best use of the letter X with electrical wiring: X.25; X11r6; X-10; and X Files.

The winner is X-10, the most popular protocol for communication over household wiring. With X-10 devices, you can turn lights and appliances on

and off, set up a security system and control it all from your computer. You can set up macros to do multiple operations triggered by a single

event. You can even use voice commands to tell your devices how to respond, or trigger events by light or motion detection.

X-10 is typically marketed as home automation equipment, but it's also useful in the office. For instance, an X-10 motion detector set up in the computer room could trigger emergency lights and a call to your phone or pager using a voice dialer device.

There are two types of X-10 devices — transmitters and receivers. Some devices do both. Receivers respond by turning attached appliances on or off, dimming lights or completing other tasks. Transmitters send signals over normal home wiring at the push of a button or when triggered by light, motion or voice command.

There is a wide variety of X-10 devices available, and there are many vendors for each type. I've posted links to some on Network World Fusion (DocFinder: 6322).

The brain of a typical X-10 system is software that runs on a PC. You can buy a basic starter kit such as X-10 Corp.'s ActiveHome or IBM's Home Director, but the best control system I've seen is Home Control Assistant from Advanced Quonset Technology. It lets you display all your X-10 devices on a floor plan of your home, while a separate pane lets you zero in on a specific floor, device or controller. The product provides wizards for common tasks for new users and a visual environment for creating complex sequences of X-10 operations connected by programming logic.

Lately, the X-10 protocol has gone wireless. I tested X-10 Corp.'s Hawkeye motion detector and Xcam Anywhere camera. Hawkeye sends a radio frequency X-10 signal to a wireless transceiver that's plugged into an electrical outlet. The transceiver sends a signal to any X-10 device or the console.

Xcam Anywhere lets you mount a tiny camera anywhere, even outdoors, and send the color image through an attached wireless transmitter to a wireless receiver within 100 feet. There's an indoor model too that would make a fine baby sitter cam. You can use the motion detector in conjunction with the camera to record images of anyone entering a room or coming to your door, for example.

The tinkerer in me really loves X-10 products. One of these days I'm going to set up a do-it-yourself home security system with X-10 technology. Memo to burglars: Please wait until I'm ready to test it.

X-10 isn't the last word in home automation. Newer products such as CEBus and LonWorks have advantages over the older X-10 technology, but they're also more expensive.

It takes a lot of gadgets for a house to become a home. I spent last weekend at the Consumer Electronics Show in Las Vegas; stay tuned for reviews. ▣

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Security staffing

How to find a competent information security pros and ensure your network is in good hands.

BY DEBORAH RADCLIFF

A network executive finds a candidate with the perfect technical qualifications. He makes an offer. The candidate considers the offer so low it's an insult. Negotiations break down. The candidate storms out, threatening, "In three months, you'll be sorry you didn't hire me."

Unfortunately, the candidate had been interviewing for a job in information security. And interviewers had told him some of the network configuration to make sure he could do the job.

"I told that hiring manager, 'You'd better check your logs carefully,'" says Michele Crabb, a senior security architect who oversees Cisco's internal network. Crabb recently heard this story at an information security conference.

Other managers tell of less frightening but similarly frustrating stories. "A lot of candidates out there claim to know what they're doing, but they really don't," says Paul Raines, vice president of electronic security for the Federal Reserve Bank of New York.

All of which begs the question: How *do* you hire a competent IT security professional?

According to Crabb and others, much of the process is similar to hiring any technologist: Background

checks, skills tests and several interviews to gauge if the candidate makes a good fit. But security specialists should also possess a healthy amount of paranoia and be trustworthy enough to guard your valuable information assets.

To find such people, companies like Microsoft lean toward hiring from inside. Fast-paced firms engaged in e-commerce want only seasoned security professionals who can get up to speed quickly. But low-margin organizations, like the Federal Reserve, hire recent college graduates. Raines starts by looking for students with extracurricular activities that show they're adaptable.

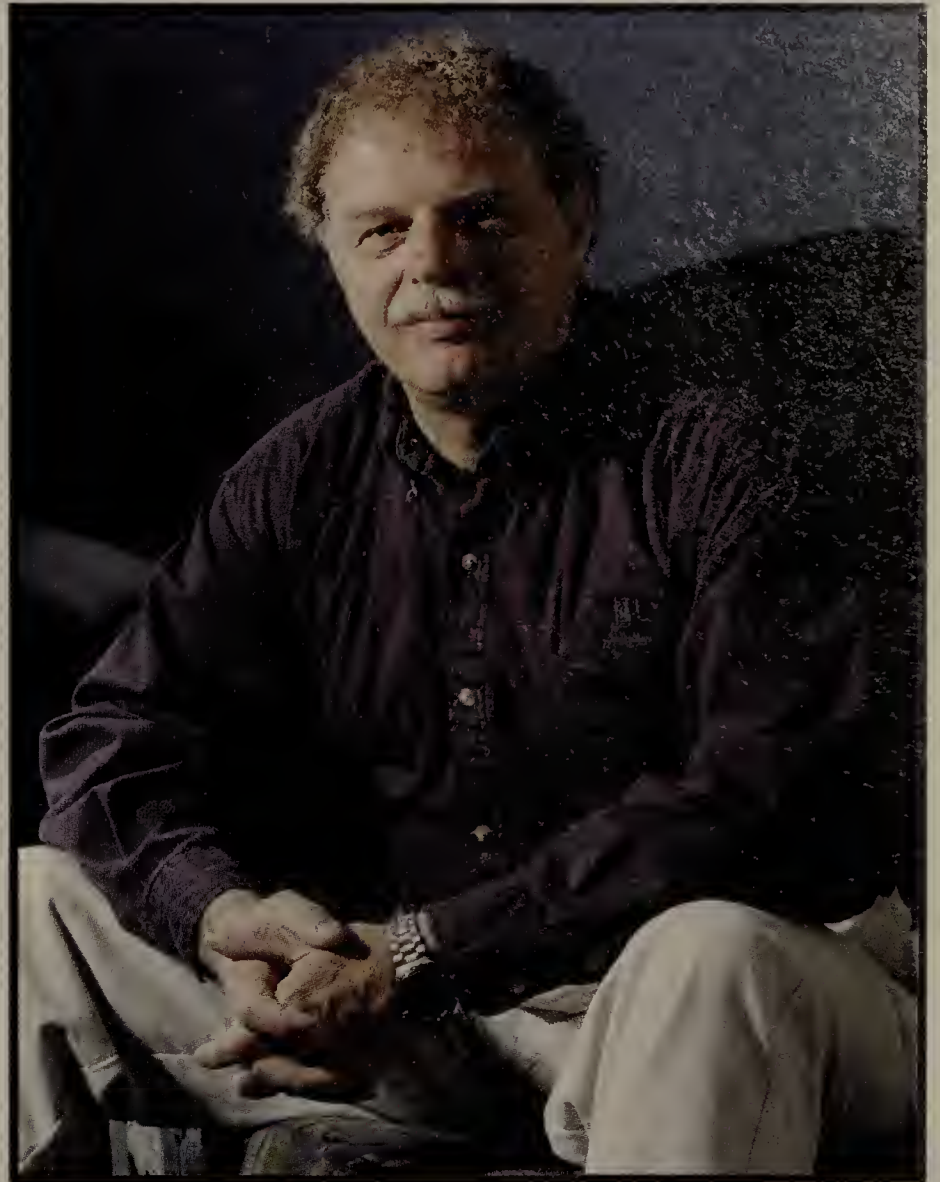
"There's one guy I interviewed who'd just graduated from Rensselaer Polytechnic Institute in Troy, N.Y. He didn't have any security experience, but he had built an electric car by himself. And he'd put in a LAN in his house," Raines explains. "I knew the guy had smarts, and I hired him. He's a star performer on our Red Team." The Red Team is a group that attacks the Fed's network to test security.

Raines also looks for specific technical coursework: Mainly Unix, networking, NT, Cisco and Java.

When it comes to hiring from within, it's easy enough to find candidates, says Howard Schmidt, Microsoft's chief information security officer. "The tough part is weeding out the wannabes from those who can really do the job," he says.

Schmidt and his staff are always looking for IS staffers who can think out of the box. For example, the employees who catch Microsoft's Red Team testing internal systems and notify his department are the ones he targets for future hiring.

During interviews, Schmidt and his team quiz candi-



Howard Schmidt, Microsoft's chief information security officer, looks for employees already on staff who catch his team testing system security.

dates to see what they would do under certain circumstances. This shows if a candidate grasps overall system architecture as opposed to isolated vulnerabilities.

While it's best to hire within the organization, start-up firms or companies launching e-commerce sites can't afford to take the time to train, says

Tracy Lenzner, owner of Lenzner and

Turn to page 42 to get the full skinny on what happens during a network penetration test.

Associates, a Las Vegas-based job placement firm that specializes in information security professionals. These companies need seasoned infosec analysts, which calls for the most rigorous screening processes.

If you hire from outside, look among your peers, Crabb advises. If that doesn't turn up anyone, advertise at technical and security conferences, or call a headhunter. And when you find the right candidate, screen, screen, screen. Then put all the interviewers together to compare notes. Look for personality traits like drive, energy, determination and integrity; professional traits like dedication and analytical skills; and a strong understanding of the business at hand.

"Security is a hard sell," Crabb says. "So security analysts must be able to explain to management and other departments how to do things the right way."

Radcliff is a freelance writer in Northern California. She can be reached at DeRad@aol.com.

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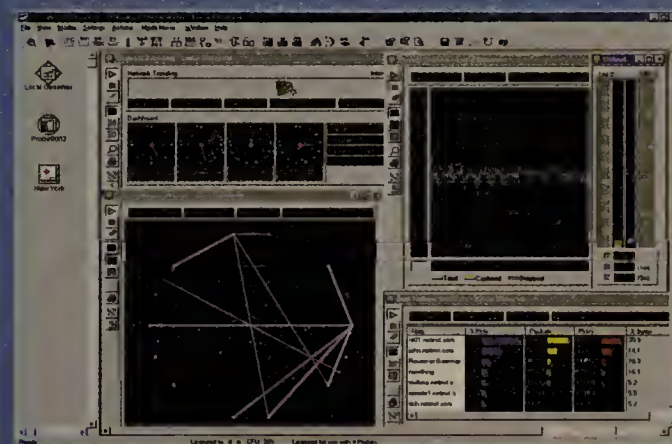
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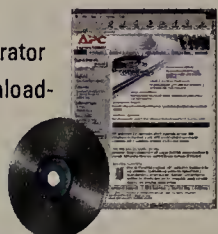
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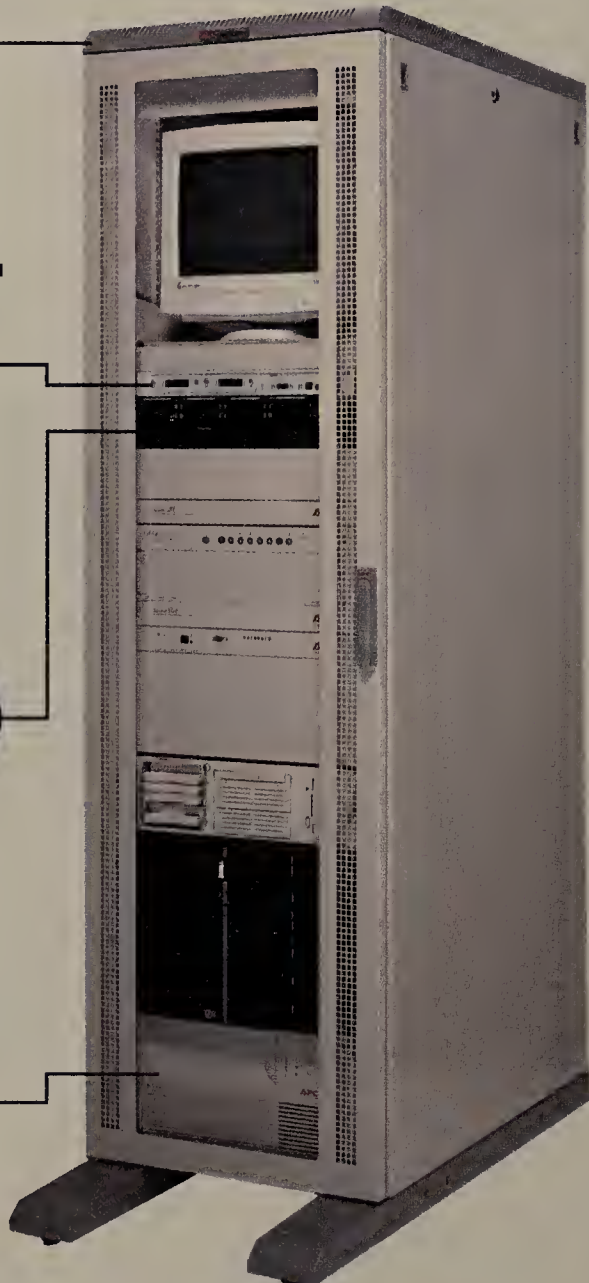
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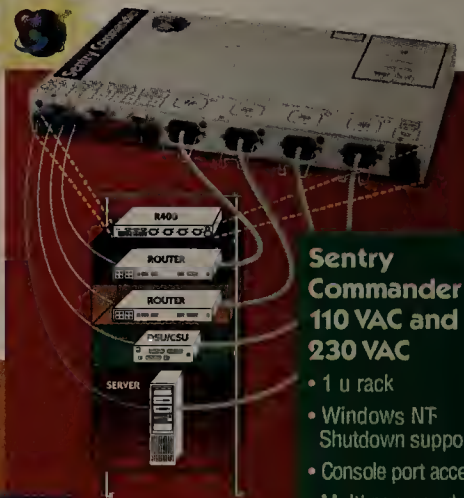


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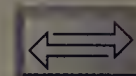
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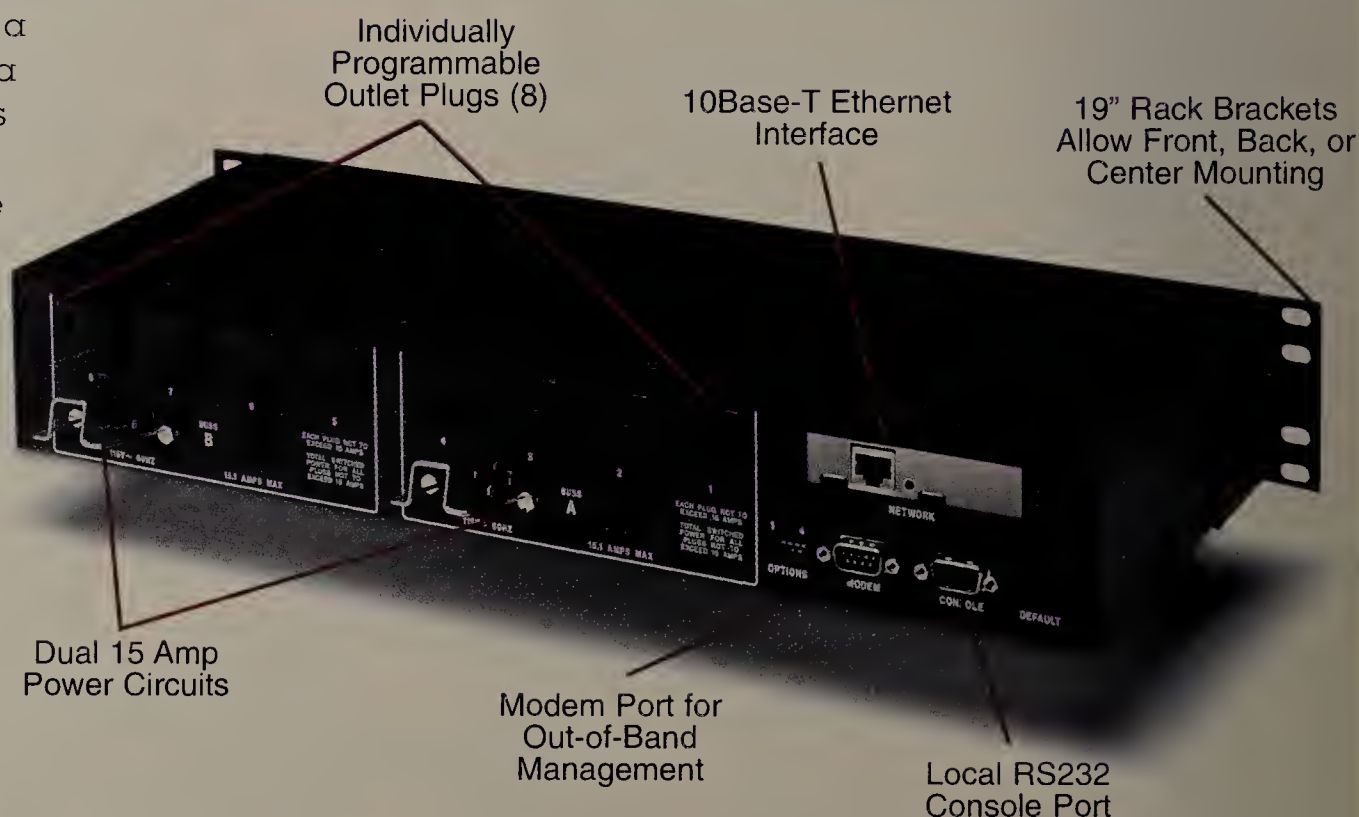


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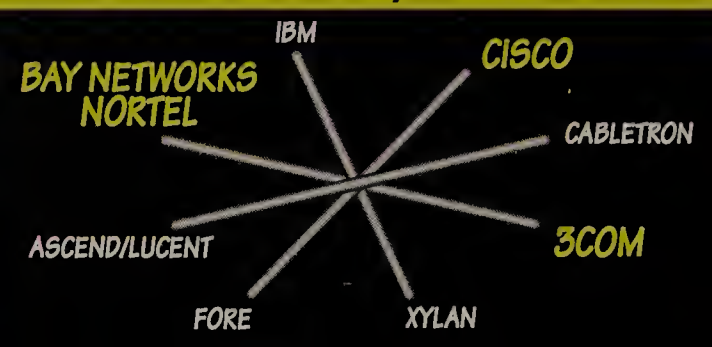
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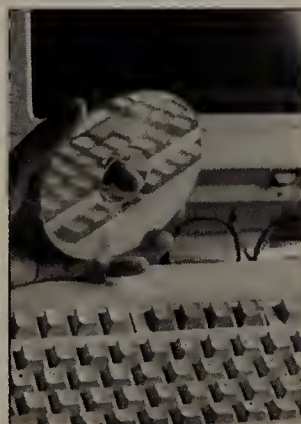
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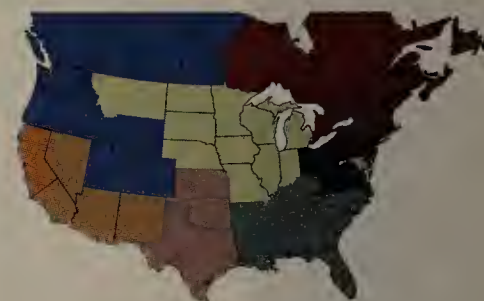
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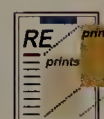


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From scratch
continued from page 1

1: Preheat the desktops

Companies usually start off with Enhanced Category-5, or Cat-5E, wiring to the desktop. In past years, Category-5 has been the standard, serving well in carrying traffic up to 100M bit/sec. But users are looking to the future.

"We're wiring for growth," says Dave Orifice, supervisor of network operations at Banyan Worldwide Services, a consulting division of Banyan Worldwide in Westborough, Mass.

Although Gigabit Ethernet is supposed to run over ordinary Cat-5, Cat-5E ensures that Gigabit Ethernet over copper will work. Orifice says the com-



Arbella Insurance's Reppucci put a premium on port density of Ethernet switches.

pany has no definite plans to run Gigabit Ethernet to the desktop, "but if the technology goes that far without getting too expensive, we're ready."

Few would dispute the assertion that any new network interface cards for the desktops should be 10/100M bit/sec Ethernet NICs. At one extreme, gigabit rates to the desktop would be extravagant. At the other, 10/100M bit/sec NICs are

as inexpensive as 10M bit/sec-only NICs ever were. As for LAN technologies other than Ethernet, they are rarely even considered for new networks these days.

2: Combine in a large closet

Desktops usually plug in to a 10/100M bit/sec Ethernet desktop switch in the wiring closet. Here, port density is a big consideration.

This was foremost on John Reppucci's mind when he installed a new network for his company, Arbella Insurance. He used Extreme Networks' Summit48 desktop switches, each of which has 48 ports of 10/100M bit/sec Ethernet in a fixed configuration.

All the 1,400 desktops are now capable of getting 100M bit/sec of switched bandwidth, a drastic upgrade from the decade-old 10M bit/sec shared hubs the company replaced.

But in the wiring closet, it's possible to have too much bandwidth. "We made access for end users so quick, we started overrunning the servers," says Reppucci, Arbella's datacom supervisor. "Now, we're looking at Gigabit Ethernet to the servers."

Many times, companies will choose low-cost stackable switches for the closet, but not always. Suffolk University recently put in a new building for its law school and used 3Com's chassis-based CoreBuilder 9000. The switch is a high-end model often used in network backbones.

"It sounds crazy, but with the density requirements of our users, we couldn't do it with stackables," says Fuad Yatim, director of network services at the school. The CoreBuilder 9000 can hold more than 500

Fast Ethernet ports.

2a: Add a little wireless to taste

The bandwidth and stability of wireless LAN technology are getting to the point where many more businesses are considering it, mainly for the freedom it gives employees to move around a building or campus with their laptops.

Start-up PurchasePro.com is quickly building out its net and evaluating 11M bit/sec wireless products for its sales force, says Brandon Mikkelsen, a network manager there. "They are a migratory type of employee," he says of salespeople.

If different offices have the same type of access points, salespeople can go to those offices and be automatically connected to the network, Mikkelsen says.

3: Mix with the backbone, and connections to a WAN

From the wiring closet, new networks often run Gigabit Ethernet over fiber-optic lines to connect to a mesh of Layer 3 switches interconnected by even more Gigabit Ethernet. Traditional routers can't handle the speeds or hit the low price points of Layer 3 switches. Further obviating the need for traditional routers is the fact that builders of new networks limit their protocols to IP.

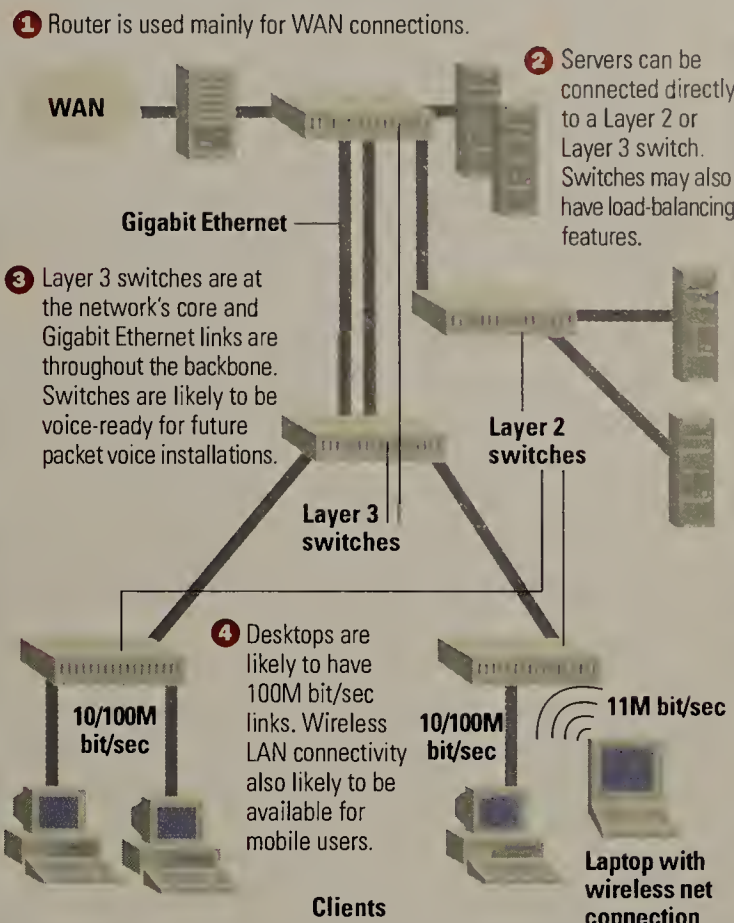
In a small network, Layer 3 may not be necessary. Mikkelsen says he's planning to keep his network of 1,500 nodes flat (that is, free of subnet boundaries) and switched. He adds that he has the option to put Layer 3 capabilities into his Foundry Networks switches at a later time, if the flat network gets unwieldy.

Many users aren't hesitant to put Layer 3 switches from a smaller vendor, such as Extreme or Foundry, into a new network. Although router king Cisco can provide all the elements of a campus network, including Layer 3 switches, a spokesman couldn't name any enterprise customers that had installed new networks with Cisco equipment.

However, Cisco routers would fit into a network for wide-area connections, says Dave Passmore, research director at consulting firm Net-Reference. Layer 3 switches usually don't have WAN connections, so a traditional router would connect to the campus backbone and be used to transmit data over frame relay or

How typical

Here's what a typical, new campus network might look like.



ATM, he says.

Toysmart.com uses a Cisco router to moderate connections between the WAN and its Cabletron Layer 3 switches in the backbone, says Jim Hutchinson, manager of network operations there. Over the WAN are the company's Web site and back-end fulfillment operations.

3a: Leave the door open for voice

There's a lot of hype about voice-data convergence, and while many users don't run voice on their data networks today, they are leaving room for it in the future. They are making sure their campus switches support the IEEE 802.1p prioritization bits that would be required for it to work.

Companies already used to traditional phone systems aren't rushing to put Ethernet phones on their desks. "Most people are assuming their PBX is going to be around for a few years," Passmore says.

On the other hand, some companies — including new companies that have never owned traditional PBXs — are looking to take the plunge into convergence very soon. "Voice over IP is definitely going to be implemented this year," says toysmart.com's Hutchinson. The company is even looking at videoconferencing as a possibility between the headquarters

and the fulfillment center, which are 30 miles apart.

4: Garnish with the servers, and serve

The servers can be connected to the network in several different ways.

Hutchinson connects some servers directly to his Layer 3 switches in the backbone, while some connect through an intermediate Fast Ethernet switch that has a gigabit uplink to a Layer 3 switch.

Load-balancing server switches are another option, but they are catching on more in Web server farms. "So far, we've only put the [server] switches on servers facing the Internet," says Marc Felton, a network engineer at NBC Internet, formerly Xoom.com. Such switches are used to handle large volumes of traffic and protect against failures. "None of our internal stuff requires we have absolutely zero downtime."

Whatever type of switch is used, network managers say they prefer to connect servers at the next speed up from the desktops.

While all this may not add up to the dream network for all, it's the one people are implementing today to take them through the early 2000s. "We feel it's a good foundation for at least the next five years," Reppucci says. ■

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Backspin

The deep dark truth about Y2K

So, Y2K arrived without problems, eh? Well that's what they want you to think, but here at the Gibbs Institute of Countermeasures and Propaganda, we know the truth.

The truth is simple; Y2K was a disaster. A real, bona fide end of the world as we know it. There were numerous nuclear meltdowns, the banking system went to hell, and the power, water and telephones failed over much of the country.

"Why," you may well be asking, "didn't I notice?"

A fine question. The answer is simple: It's a government cover-up! That's right, somewhere under the Rockies the government has acres of enormous computers simulating the stock market, generating artificial news and generally faking it.

That telephone call you had yesterday from your incredibly irritating aunt in Huntersville, N.C.? That wasn't her, she was zapped out of existence when the security system at Duke Power Company's McGuire plant decided that, as it

was the start of the 20th century, all worker IDs must be fake and promptly sealed off the reactor room to stave off terrorist incursion.

Alas, when the thermic lance cut through the doors the emergency crew was just in time to see the reactor vessel collapse as the core headed toward China. That was nothing compared with the explosion that followed which sent your aunt to join the choir invisible.

Who called you then? Why, those computers under the Rockies. They've been monitoring your calls for years, and they knew it was time for you to be irritated by her again.

Don't believe me? Call her up. Listen carefully. Does that line sound tinny? Does she sound rather odd? Could that be because you're the last person she expected to call her or because she's artificial? You decide.

And why isn't the Internet a-

buzz with rumor and speculation? Well, actually it is. It is just that the government is filtering everything you — yes, you personally — get from the 'Net. And the same applies to all the people you actually physically see. You are all being manipulated.

The deception is clever, really clever. You know all that spam you receive? Government-generated. If it had just stopped, it would have been a dead giveaway. And you know what's worse? The whole spam phenomenon was a government creation from the very beginning!

Just think about it: The government knew that Y2K hell was going to break loose and by generating tons of spam, and for that matter, all those telephone sales calls that happen just as you sit down to dinner, they created a noise background that could be used to give you a sense of continuity even when the fabric of society has been, in reality, torn apart. As indeed it has been. Clever.

It goes further: Anyone who starts to speculate, spread rumors or tell the truth is "isolated." You've heard of the black helicopters? They belong to the UN, which is working with the U.S. government to control the world (you didn't know? Sheesh.). And obviously if the U.S. goes to hell, there's not much hope for the new world order. Hence the big coverup.

And more than that, much of what you think is the government is artificial. How else could you explain Bill Clinton or Al Gore? How could a candidate such as George W. Bush exist except in a computer-generated simulation? And consider that Jeff Bezos was *Time's* Man of the Year. See what I mean?

So, there's not much time. Tell your friends, tell your neighbors. Don't call anyone, don't send e-mail, you have no idea whether the recipient exists or is just computer-generated, and anyway, those computers won't let you. Hell, you can't even trust this column — I might be simulated.

Must go, I can hear a helicopter outside.

Suspicious to nwcolumn@gibbs.com. Use a carrier pigeon.



MARK
GIBBS

'NET BUZZ



The latest on the
Internet/intranet industry

Chances are most of us and/or our loved ones will work from home at some point before retirement beckons. After all, remote access technologies are advancing a whole lot faster than rush-hour traffic.

So why all the uproar over last week's common-sense decree from the **U.S. Labor Department** regarding employer obligations to telecommuting employees?

"Ensuring safe and healthful working conditions for the employee should be a precondition for any home-based work assignments," read a letter from the Labor Department's **Occupational Safety and Health Administration (OSHA)**.

This basic notion shouldn't be cause for alarm, unless you happen to be a sweatshop owner looking to save on rent or a devout libertarian. However, the airwaves and news pages were awash with critics last week who apparently fear an invasion of OSHA home wreckers that will result in telecommuters being shackled to their old cubicles. By week's end, a chastened OSHA had "withdrawn" the letter and promised to rethink things.

Granted, the details are everything here. If Washington really does want to dictate decorating schemes or ban smoking in home offices, then I'll be the first to grab a pitchfork and lead the revolt. But the principle here seems clear enough: An employer cannot absolve himself of responsibility for the work-related safety of employees simply by telling them — or even by allowing them — to work from home.

A personal anecdote to illustrate the point: For several months last year Buzz suffered elbow pain so severe that typing, Web surfing or lifting a 12-ounce beer took a mighty effort. The mouse and the keyboard — those twin terrors of modern office life — were clearly to blame.

After four visits to two doctors, eight ineffective physical therapy sessions and one miraculous cortisone shot, the pain has all but disappeared. However, the bills and the possibility of a relapse remain, which is why my employer has both helped me file a worker's compensation claim and given my office an ergonomic makeover, including a fancy new chair that does everything but massage my lumbar.

The idea that *Network World* might be obligated to do anything less for one of my telecommuting colleagues strikes me as difficult to defend. The lines between central, branch and home offices will only get blurrier. Why should only two of these three be afforded the protection of sensible workplace safety regulation?

Perhaps you shared my reaction to the news that someone had bid \$10 million in an eBay auction to acquire the domain name Year2000.com: Who would be crazy enough to pay that much for that name, especially since we're on the safe side of the Y2K divide?

In retrospect, the answer appears to be no one.

Last Wednesday, the keepers of www.year2000 — computer consultant **Peter de Jager** and **The Tenagra Corp.** — acknowledged the much-ballyhooed \$10 million bid had been bogus.

"It has now been determined that all the bids were 'not sincere,'" is how the situation was delicately described in a press release. The owners will forego another auction in favor of private bids.

Here's hoping they do find a sincere buyer. The site was a fabulous resource and de Jager has more than earned his post-Y2K parachute.

Repeat after me: Free means no strings attached.

Reports last week touting "free" DSL from an outfit called Broadband Digital Group highlighted only the latest misappropriation of an adjective that once had a clear meaning. Like others of its ilk, the DSL offer comes dripping with ifs, ands and strings, starting with a demand for all your personal data.

Here's an idea: Instead of describing these deals as free, call them barter-based because the parties are actually swapping commodities.

Sending us Internet news tips and gossip really is free. Try buzz@nww.com.



PAUL
MCNAMARA

Is the router on the left really worth twice as much as the one on the right? You decide.

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ROUTING	OSPF	✓	✓
	RIP	✓	✓
	Legacy Protocols	✓	✓
VPN	IPSec	✓	✓
	Firewall	✓	✓
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